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P R O C E E D I N G S

of the

SELECT COMMITTEE, APPOINTED BY THE ONTARIO
LEGISLATURE, TO ENQUIRE INTO CERTAIN MATTERS
AND LEGISLATION REGARDING SMOKE CONTROL AND
AIR POLLUTION, IN ONTARIO.

Mr. A. H. Cowling, Chairman,
Presiding.

Dr. Frederick Evis, Secretary.

Volume III

Tuesday, September 20th, 1955,

Toronto, Ontario.

R.C.Sturgeon,
Official Reporter,
Parliament Buildings,
Toronto, Ontario.

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T H I R D D A Y

Toronto, Ontario,
Tuesday, September 20th, 1955,
10:00 o'clock, a.m.

- - - - -

The further proceedings of this Committee
reconvened pursuant to notice.

Mr. A. H. Cowling, Chairman,
Presiding.

PRESENT:

Messrs. Brandon, Q.C.,
Murdoch,
Morningstar,
Elliott,
Macaulay,
Gordon,
Thomas (Oshawa)

Hon. Mr. Kelly

Dr. Frederick Evis, (Secretary)

APPEARANCES:

Mr. C. Pullan,)	Representing the
)	Greenwood Avenue
Mr. A. E. Ashman,)	Residents
)	
Mr. C. Wilmotte.)	

- - - - -

THE CHAIRMAN: Gentlemen, I would like to welcome everybody back to our meetings again. We have one new member in our midst, in the person of Mr. Elmer Brandon, the hon. member for West York, who replaces "Bill" Beech, one of the fallen. Otherwise, the composition of the Committee is the same as it was.

Our Secretary has prepared two volumes of the work of the Committee before we were interrupted temporarily, and I would like you all to have one, and I think one of the first things would be to officially appoint our Secretary.

If I may have a motion in that regard, the Chair will accept it.

Mr. Macaulay moved that Dr. Frederick Evis be appointed Secretary of the Committee.

Mr. Elliott seconded the motion.

Motion agreed to.

THE CHAIRMAN: I wonder if the Secretary would call the roll and see who is present.

---Roll call; members present as heretofore noted.

MR. MACAULAY: Mr. Chairman, when the Secretary is finished, do you think we might take a few minutes to bring us up to date on the proceedings so far?

THE CHAIRMAN: Yes, I think that would be a good idea. Before asking the Secretary to bring the present

business before us, as there are some of the members who were unable to attend in the past, and perhaps I should ask the Secretary to brief us on the two volumes. I think it might be well to read into the minutes today that we would like to have included in the minutes these Volumes I and II of our proceedings, held last spring.

MR. ELLIOTT: Then you will call this meeting "Number III"?

THE CHAIRMAN: Yes. Will somebody so move?

Mr. Brandon moved Volumes I and II be made a part of the proceedings of this Committee.

Mr. Morningstar seconded the motion.

Motion agreed to.

THE CHAIRMAN: Now I will ask our Secretary to briefly bring us up to date on these two Volumes.

DOCTOR EVIS (Secretary): I do not know whether I can recall all of this "right off the cuff". One important thing I think is the fact that there was a dicussion in regard to the public-relations services, to look after the public relations of the Committee. That will be found on page 5, of Volume I.

MR. MACAULAY: What do you mean by that?

THE CHAIRMAN: There was a group here who were acting as sort of promotion experts in public relations in towns and cities where we will be visiting,

and generally to gather together information which would be of interest to the Committee, and help them in its assessment of the whole subject of air pollution and smoke control.

MR. MACAULAY: Was that composed of members of the Committee itself, or has some body corporate offered its services?

DOCTOR EVIS (Secretary): This (indicating) is from Public Relations Services Limited, addressed to Mr. Cowling, the Chairman of the Committee, and it reads:

"Dear Mr. Cowling:

As you know, some of the important problems and work facing your Committee will be of a public relations nature; in research on public attitudes, awareness, biases, etc.

We feel that we can be of use to you. Our experience on Air Pollution and Smoke Control subjects has been as follows:

- a) Studies and public relations work in connection with smelter fumes from a large mining company in the West;
- b) Somewhat similar work connected with the large, publicly-owned Polymer Corporation at Sarnia in its earlier stages;

- c) Some special familiarity with research on exhaust problems from motor traffic in highly congested traffic areas;
- d) A detailed study and report on Mine Ventilation and silicosis prevention for the Ontario Mining Association. (Copy attached)

In addition to some 25 years of public relations work concentrated in Ontario, we have special opinion research sampling methods which are economical and efficient.

It is our practice to work on a quarterly retainer basis for which we charge a professional consulting fee, guaranteeing a stipulated amount of work. Expenses are in addition and not incurred without the approval of clients.

The attached comments from clients will give information as to our record of performance.

Yours respectfully,

PUBLIC RELATIONS SERVICES LIMITED

(signed)'Duncan Heriot'".

MR. MACAULAY: Was any enquiry made as to what their fee would be?

THE CHAIRMAN: It is in the minutes, I believe. We saw them, and we went briefly over the figures.

MR. MACAULAY: Did you decide to hire them?

I am sorry to be taking up so much time.

THE CHAIRMAN: No, it was the decision of the Committee that this be deferred.

MR. ELLIOTT: I suppose we have all noticed in the Press that the Ontario Manufacturers Association is going ahead with an investigation on their own. I wonder if we could not work in co-operation with them.

THE CHAIRMAN: I was in touch with them, and this matter will come up under the heading of "Correspondence".

MR. MACAULAY: The Committee decided not to engage them? Is that right?

THE CHAIRMAN: Yes.

MR. MACAULAY: Is that also to be the policy from now on?

THE CHAIRMAN: It is still open for discussion.

MR. MURDOCH: We decided to wait until we had held another meeting or two, to see what progress we made, and then decide whether we could use their services.

THE CHAIRMAN: It is not a dead issue. It can be considered at a later date.

MR. MACAULAY: May I suggest that my feeling about this Committee and the work it is going to do is this; that this is a very propitious moment to have a

thorough study of this matter made. Another committee may not be set up for quite some considerable time, and I think we are faced with a challenge, and I doubt if we can complete our report for the next Session of the House -- that is my own view -- but we could present some kind of an interim report, and ask to be re-appointed.

What was their fee?

THE CHAIRMAN: I think it was \$500.00 on a quarterly basis.

MR. MACAULAY: Is that for every quarter?

THE CHAIRMAN: Rather than have them paid as the work was done, it was on a quarterly basis. The \$500.00 was to be paid as the work was done.

MR. MACAULAY: That could be \$500.00 every three months or \$500.00 for the survey, paid in four instalments.

DOCTOR EVIS (Secretary): It is \$500.00 every three months, I think.

HON. MR. KELLY: In other words, the fee is about \$2000.00?

THE CHAIRMAN: Yes, roughly.

MR. MACAULAY: I recall from sitting on the Liens' Committee there is a tremendous amount of work devolved upon the Secretary in setting these things up.

I do not know whether these people are the right people, or whether the service they offer is what you really want, but we should have somebody responsible for setting up our trips to various cities, so we can secure as much information as possible wherever we go. This is a tremendous job for the Chairman and the Secretary.

THE CHAIRMAN: It is an open question. We can discuss it now if you wish. That is what we are here for.

MR. ELLIOTT: I can give you a picture of the situation in Hamilton.

We have a Smoke Abatement Committee in Hamilton. The Building Commissioner is on that Committee. He is an engineer himself. It is a Committee set up of citizens, and the Chief Engineer of the Canadian Westinghouse has been the Chairman ever since the Committee was instituted.

The Committee is composed of eight or ten people who represent practically every known organization in the city, including labour. The Medical Health Officer is on the Committee as well.

I have discussed the situation with them, and they are ready for us to come to Hamilton at any time, and they want to take us for a tour of the manufacturing plants first, and look them over, and then perhaps meet

with the Committee, which can give them a true picture of the way they see the situation, and what has been done up to now in Hamilton.

MR. MACAULAY: Do you envisage a two-day trip, one day to go around and another day in meeting the public?

THE CHAIRMAN: Yes. How would it be if after reading the letter from the Public Relations officers, we ask them to re-appear, and go over their proposition again? We might make arrangements for them to come this afternoon or tomorrow for a few minutes, and the members, if they wish, can question them on their proposal.

MR. BRANDON, Q.C.: I would like to hear from them first-hand. I think the way it stands at the moment -- speaking for himself, at least -- it would be more interesting to learn what kind of service they can render. I think it should be something very concrete.

THE CHAIRMAN: If that is the opinion of the Committee, I will ask the Secretary to contact these people, and perhaps they can come here tomorrow and tell us about it first-hand.

DOCTOR EVIS (Secretary): Perhaps I could get them this afternoon. Tomorrow, we have Doctor Newbury, who may take quite a bit of time.

MR. MACAULAY: While the Secretary is out, Mr. Chairman, I am anxious to say to my colleagues on this Committee that I have done a great deal of work on this thing, because it affects my own riding so much. I do not want anybody to think I am trying to be aggressive in relation to this, as I am not. But it affects my riding so much, and I have very strong views on it. I am most anxious to do what the Committee wants, and will follow its desires, but I do have some views on this thing.

I feel if we are going to, for instance, Hamilton-- just to come back to the point -- we have an hon. member here for a Hamilton riding who has been an outstanding member of this House for a long time, and he has various problems in Hamilton. I do not think his problems are any less than perhaps Sarnia or Windsor or some other places, and I have the feeling that when we go and visit these cities, we should try to make a tour of the city itself, and then follow that up, if necessary, by meeting with the people who are interested, because I think in most progressive towns and cities they have a set-up similar to this. Do you not think so?

MR. ELLIOTT: I do not know for certain, but I would think so.

MR. MACAULAY: I think it is a great mistake

to try and "ram" too much into a day, and I think this is a great opportunity to bring in a worth-while report, which may have a very strong bearing on public education.

THE CHAIRMAN: We are in the course of sending out a communication to every hon. member of the House asking for his suggestions and comments, and if he has any local problem, to bring it to our attention.

I, as Chairman, feel that when we visit these cities -- particularly the Ontario cities -- the local member should be advised, and asked to accompany us on the tour, and to let us have his problems. He is acquainted with his own local area. I am sure you will agree that if we do that, not only will we have the local opinions before the Committee, but the local member could act as an ex officio member of the Committee.

MR. MACAULAY: Mr. Morningstar has certain problems in his riding, as has also Mr. Thomas in Oshawa, and Mr. Brandon in his riding, because those areas are growing to such an extent, that there is much which can be done in a planning sense, perhaps more so than in the heart of the city of Toronto. That is why I think it is important that we plan as to how we will conduct ourselves, and to use great care in our efforts, because we do not want to do this thing half way.

THE CHAIRMAN: I think your point about time is

well taken. We have lots of time, and I do not think the Committee need hurry this thing at all. We can visit every place where they want us to go, and see everybody in the province, or any other place, who wishes to appear before the Committee, and, with your consent, that is the way we are going to proceed.

MR. MACAULAY: I have not the experience which Mr. Murdoch, Mr. Elliott, or the hon. Minister (Mr. Kelly) has, but I know that it is the tendency amongst many of the Committees to try and cover too much ground in too short a time, and everybody gets so pressed for time that they cannot attend all the meetings, and do not arrive at as sound decisions, as might otherwise be the case.

THE CHAIRMAN: These public relation people are coming here this afternoon to give us first-hand information.

MR. ELLIOTT: To follow up Mr. Macaulay's remarks, I feel there are a number of places on the North American continent where they have either now or have had this smoke condition, and I think those are the places we should visit, so we can bring something back to help the people of our own areas, who have these problems confronting them.

MR. MACAULAY: Is it your view that we go

elsewhere first?

MR. ELLIOTT: Yes. If we get their problems, then we have something to offer to the people in our own ridings. Just to prove that, the Manufacturers Association is starting this plan of going into the situation thoroughly, which proves that they themselves are simply groping around in the dark, but are willing to go into the situation, and probably will come up with something worth-while. I believe we should give to industrial plants all the help we possibly can. Personally, I would like to see the plants all operating at full capacity, and a certain amount of help given to them if need be.

I think the best way to do that is to visit the places where they have had these bad conditions.

MR. MORNINGSTAR: That is what I was wondering. If there is a township where they have different smoke conditions. What are we doing in that connection? We should be able to tell them, so they will know how much can be done.

MR. ELLIOTT: I might say the worst conditions we have are in the steel plant and the chemical works, which are there, too.

The plants where they manufacture soaps and detergents, have a good deal of acid connected with them,

and it is quite a chemical process.

MR. MACAULAY: Where they have a lead product of any nature. For instance, in Toronto, they re-claim lead from their operations, and in other plants this sulphuric acid is going up into the air, which is actually more dangerous, in a way, because it cannot be seen. That, in itself, is more injurious to lungs than the fly ash, which people can see. I feel that the greatest danger from air pollution is from that which cannot be seen rather than that which can be, for two reasons; what can be seen can be combatted, whereas that which cannot be seen is unknown, and secondly, from the point of view of public support.

MR. MURDOCH: We will visit these plants.

HON. MR. KELLY: Mr. Chairman, before you complete this: there are the sulphur fumes in Sudbury. As you will probably recall, the Department of Agriculture sent in their men from Guelph to make a survey of the area, and I have the report here. I only have one copy, but I think it would be a good idea to file with the Secretary sufficient copies for all the members.

It deals with the damage from sulphur fumes in the Sudbury area, and was conducted by Doctor McLaughlin, Mr. Huntley, and Doctor Bell, all of the Agricultural College at Guelph.

---Report was admitted into the record and is marked Appendix "E" following these proceedings.

They made this survey to determine the extent of the damage from sulphur fumes in the Sudbury area. It is not a Mines Department matter whatsoever; it is the Agricultural Department.

MR. ELLIOTT: Is it in connection with mining?

HON. MR. KELLY: In connection with sulphur fumes. The Department of Agriculture did it on its own.

MR. ELLIOTT: Do you do a survey of your own?

HON. MR. KELLY: Yes, we have a sulphur fume arbitrator up there, a Mr. Murray.

MR. MACAULAY: I think he should be interviewed at some stage.

I have found, when we travelled, that we collected a great deal of material, and I think when we get the reports, we should get enough copies for every member, and I wonder if the Secretary might get some kind of a folder so we could keep our stuff all together?

THE CHAIRMAN: Yes, that can be done. Shall we proceed with the briefing?

MR. MACAULAY: One last thing, if I may --

THE CHAIRMAN: You can interrupt as we go along, of course.

MR. MACAULAY: Doctor Allcut is at the University, and I wonder if some arrangement cannot be made

with the Doctor so that he can attend with this Committee on certain of the trips. He is an international authority. He is well known to these people, and I think he could be of inestimable value on some of the American trips, because he has contact with the authorities, at their national and international meetings in the United States and elsewhere. He has really done the chief survey work, from the Canadian point of view.

MR. ELLIOTT: He is from the University?

MR. MACAULAY: Yes.

THE CHAIRMAN: He is Chairman of the Air Pollution Advisory Board of the city of Toronto and Chairman of the Canadian Standards Association Committee.

He knows what he is talking about.

MR. MACAULAY: Yes. He is a good man, and I think he should be asked to accompany us on some of our trips, if he can arrange it.

THE CHAIRMAN: I think that is a mighty good suggestion.

MR. ELLIOTT: To have him go along as the technical advisor of the Committee?

MR. MACAULAY: That is what I was thinking, if it is agreed upon, we might appoint him as the technical advisor to the Committee. I think he would

be most valuable to this group. I think he would be a very important adjunct.

THE CHAIRMAN: I know from talking to him, it is a question of the time away from his work. I wonder if we could get him over here today or tomorrow, just for a few minutes, and he could go over some of the things he discussed with us, and we could ask him about accompanying us at that time.

MR. MACAULAY: Not to give evidence on the circumstances, but to work with us when we are lining up our programme.

THE CHAIRMAN: Now, we will go ahead with the briefing. Interrupt at any time, gentlemen, on any point. We are just reviewing what we did before.

DOCTOR EVIS (Secretary): It was pointed out that one of the big troubles in connection with air pollution is the railways, and that the railways are governed by what is considered an obsolete order by the Board of Transport Commissioners for Canada, dated November, 1908. The order has been read, and is in the minutes.

MR. MACAULAY: In that connection, those in the Hamilton area and the Windsor area, and in Toronto also, have a problem -- and I have no doubt that the Welland area also has it -- that is, a problem in

connection with steamships. I think it comes under some order of the Board of Transport Commissioners as it affects Canadian ships, and ships of international registry, when they come into port.

MR. MURDOCH: That is under the International Joint Commission.

MR. MACAULAY: When a ship is in transit, there is nothing we can do, but when the ship comes into port, the municipality then has some power over it.

THE CHAIRMAN: That is right. When a ship, regardless of its origin, affects citizens of the province, the province can do something about it.

MR. THOMAS (Oshawa): Even if it is outside the three-mile limit?

MR. MACAULAY: If a ship ties up in Toronto, and is loading or unloading --

THE CHAIRMAN: Then we can definitely have control over it.

We are going to arrange a meeting with the Board of Transport Commissioners, and are also going to arrange one with the International Joint Commission, to get their views on this question.

MR. ELLIOTT: I spoke to our Commissioner in Hamilton yesterday, and he told me that 70 percent. of the prevailing winds there are away from the harbour, and

only 30 percent. are against the city, and he said, if the Committee wished, he would like to have them come over some morning or afternoon, and he would get the boat out, and take them on a tour of the harbour.

But we have not too serious a problem there, because the prevailing winds are usually favourable to the city of Hamilton.

MR. MACAULAY: We have the south and west winds, and unfortunately the stuff does not seem to fall at all, until it gets to my riding.

THE CHAIRMAN: That is the type of co-operation we want from everybody.

MR. ELLIOTT: Any morning or afternoon, it can be arranged to have the boat available, and take you on a tour of the harbour, and they will have somebody there to explain the whole situation.

MR. MACAULAY: In relation to Toronto, when you come to make these arrangements, I would like to have a trip arranged through the harbour here and if it will not interfere with the cross-the-lake swimmers, we should go out three or four miles into the lake, so you can see the pall which hangs over this city. It may be necessary to go even further than that.

THE CHAIRMAN: We can arrange with our Harbour Board to do this, I imagine.

DOCTOR EVIS (Secretary): The next item: there was a good discussion about the legislation in Ontario, and I was asked to get it together, and it has been put in a mimeographed form.

There was some discussion about whether the present provincial legislation was strong enough, in that it exempted certain works, such as the brick works, cement factories, smelters, and groups like that.

Under Section 399, there is a somewhat cumbersome method for the municipality to bring these exempted industries under the Act, and from what Mr. Neilson and the other officials in Toronto say, it does not work too well in practice.

MR. MACAULAY: One of the real problems in relation to this Act itself is this; there is quite a conflict apparent. The municipalities are given power to bring in other than those governed by international protocol and those things under the Federal government, such as ships, and railways, and places like a brick company, one of which is on the edge of my riding, and is one of the greatest offenders we have, and which has these stacks belching smoke hour in and hour out, and apparently is unprepared to make any amendment to its equipment, because it feels it will be an expense they might not want to carry.

The result is the city of Toronto has the legislative power, as have the other cities, to include these dangerous offenders which are at present excluded, but to get them under the Act, they have to go around so many corners, and follow so many paths, and go up and down so many stairs, that the cities have not done much to include them.

Then, it goes the other way, too, and they have these large companies lobbying to defeat the legislation or amendments, on the ground that if they are included, they will move elsewhere and the city will lose the assessment and the taxes.

Several years ago, there was a Council lobby, and the city of Toronto left out some of these dangerous offenders, because they chose between industries and the people.

It is very well to say there is enough legislation, but it is so cumbersome as to make it impracticable.

MR. ELLIOTT: I have found the same thing in talking to our Commissioner. He said every municipality in Ontario has its legislation which conflicts with that of other municipalities. He admits that in Hamilton we are very fortunate, in that while we have two brick manufacturers, they are situated in such a way that they do not create much of a problem at all, but it is only on

account of their strategic position. There is no legislation given to the municipality to control them in any way, shape or form.

MR. MACAULAY: Then there is the other chief offender referred to earlier, the chemical companies, which put up in the air the invisible drops of acids of one form and another which are far more injurious to the lungs, or a condition of skin cancer and lung cancer, than the fly ash.

THE CHAIRMAN: I think we should meet with some of the local smoke abatement officers, who have done a good job. At our last sittings, we visited two or three of the plants where they have practically eliminated the nuisance or reduced it to a minimum. On this particular point, I do not think any of us want to legislate so severely as to put people out of business.

MR. MACAULAY: No, of course not.

THE CHAIRMAN: We want their co-operation and to educate them if possible, and only as a last resort should we really "lay down the law".

MR. MACAULAY: But there should be a compromise with industry, as to what they are entitled to, and to the life our citizens have a right to expect.

---The legislation referred to was admitted into the record and marked "Appendix F" following these proceedings.

THE CHAIRMAN: It is, in a nutshell, the work of this Committee, to arrive at something which will do that.

MR. ELLIOTT: We have two brick works, but they happen to be up near the mountain, and there is no nuisance there at all. But with the chemical plants, we have the same problem as others.

MR. MACAULAY: I have a great deal of material here which I will show you in time. It has been said that a great deal of this problem is created by industry, but a great deal of these smoke fumes and air pollution does not necessarily come from industry, and as proof of that I have pictures which have been taken on Sunday mornings when the boilers were quiet, and yet we had one of the worst smoke conditions ever, which was on the Easter weekend, when you could not see the sun through the smoke in the air. So there is more to it than industry.

One of the worst offenders in the city of Toronto is the city incinerator, maintained by the city of Toronto, which will not do anything, apparently.

There also is another offender in the housing on Bain Avenue.

THE CHAIRMAN: That is the Toronto Housing Authority?

MR. MACAULAY: All these premises are heated with one furnace, with one big high column-chimney, and

I have two women who will appear before this Committee, who, after this thing was erected, were unable to stay in their gardens, and the woman next door to them has five children, and she had her washing out all day. I went to look at it, and she said that in the evening she had to bring the laundry in and had to go in and redo the whole thing.

That kind of thing is not consistent with the rights of the residents, it seems to me.

THE CHAIRMAN: Speaking of city buildings, I think the Committee will agree generally that the worst offenders are not only the city buildings, but all public buildings, provincial, federal and everything else. I think there is no question about that.

MR. MORNINGSTAR: What can you do about it?

THE CHAIRMAN: We will do something about it.

MR. MACAULAY: Here (indicating) is a picture which I thought might interest Mr. Morningstar, and which shows what the smoke looked like, before they put in a smoke and ash reducer. The picture to the left is before they put in the equipment, and the one to the right is how it appears after the equipment was put in.

I think we should call some of these equipment people before us.

MR. ELLIOTT: That is why I think we should make as full an investigation as we can. I think that gases are as important as smoke.

MR. MACAULAY: They said, for example, that when Diesel engines were brought in -- the railway goes right through the heart of my riding -- it would cut out a great deal of air pollution, but I think they were thinking in terms of fly ash from the engines, and I think Doctor Allcut has said something which is about in line with what Mr. Elliott has said, that what the Diesel engines are coughing up into the air is more dangerous than the fly ash.

I will bring a person before this Committee who sweeps one bucket of fly ash off her porch every day.

MR. MORNINGSTAR: Were there residences there before this was installed, or afterwards?

MR. MACAULAY: These residences have been there for a long time.

DOCTOR EVIS (Secretary): Mr. Elliott made the point there is great variation between the various municipalities in the way their local by-laws are drawn up. They cannot even agree on a definition of a simple thing like "soot". I arranged to write to practically every municipality on the continent, and many of them sent back a copy of their local ordinances and by-laws,

and I have a big stack of them, and Doctor Mastromateo and Mr. Belyea, who is an engineer, and I, have been trying to sort these things out, and we are attempting from the whole lot to come up with a suggested model ordinance which will be reasonably practicable.

We have some definitions upon which we agree now, and when we get time, we will proceed to analyze these things. But it is a big job.

MR. MACAULAY: You may remember that Mr. Auld, the member for Leeds, who lives in Brockville, made a very good point in the House when he said a great many smaller municipalities do not know what to put into a by-law. They want to do something, and the people are prepared to co-operate, but they do not know what to put in the by-law, and if, as one of our jobs, we could draft a by-law that is reasonably good both for the public and industry, it would be of great assistance to these smaller municipalities, and would help them to a great extent.

THE CHAIRMAN: They could use it as a guide?

MR. MACAULAY: Yes.

DOCTOR EVIS (Secretary): I think, with the assistance of our Industrial Hygiene Branch, we should try to draft a suggested by-law, and bring it before the Committee, and the members can then discuss it.

MR. ELLIOTT: After we have made a study of this, and visited other municipalities, then they should be asked to submit briefs, and from them I think we can compile some pretty fair legislation.

I would say that Mr. Macaulay is 100 percent. right, when he said it cannot be done this Session, but there could be an interim report made to the next Session of the Legislature. However, it will take all of this year, and, in my opinion, all of next, to make the kind of studies which will be necessary in order to help all the municipalities. After the studies have been made by ourselves, and if we have information from other places, then we can come back and help our local municipalities, which will then see what we are trying to do for them.

MR. GORDON: I have a copy of the last by-law passed in 1937 in the city of Brantford. I also have a petition here from a number of citizens close to Brantford, which was given to me just before the Committee ceased its sittings. It is signed by some 30 citizens in connection with air pollution coming from a certain plant at Brantford. I would like to put these in the record. You will see that in the Brantford by-law, it contains something similar to that passed by other cities in that it excludes foundries.

MR. MACAULAY: What is the name of this Company?

MR. GORDON: The Canadian Packers in Brantford. And there are some 30 residents there petitioning against the air pollution coming from this factory. They are located on the old airport; they make use of a hangar and they do not have all the necessary facilities, but, at any rate, the citizens in the district are suffering severely.

---Brantford by-law, 1937, and the petition referred to by Mr. Gordon were offered and admitted as part of the record, and are in words and figures as follows, to-wit:

(page 148 follows)

" BY-LAW NUMBER 2591

- of -

THE CORPORATION OF THE CITY OF BRANTFORD
To Compel the Prevention of Smoke Nuisance.

WHEREAS BY-LAW Number 2229 of the Corporation of the City of Brantford to compel the prevention of smoke nuisance, does not comply with the provisions of The Municipal Act, R.S.O.1927, Chapter 233, Section 399, Subsection 45 and it is advisable for the by-law of the City of Brantford to conform with the provisions of the statute. THE COUNCIL OF THE CORPORATION OF THE CITY OF BRANTFORD ENACTS AS FOLLOWS:

THAT paragraphs numbered 1 and 2 of By-law number 2229 be and the said paragraphs are hereby amended to read as follows:

1. Every owner, lessee, tenant, agent, manager or occupant of any premises in, or of a steam boiler in connection with which a fire is burning, and every person who operates, uses or causes or permits to be operated or used, any furnace or fire within the limits of the City of Brantford, shall prevent the emission to the atmosphere from such fire or opaque or dense smoke for a period of more than six minutes in

any one hour, or at any other point than the opening to the atmosphere of the flue, stack or chimney. Provided always that nothing herein contained shall apply to a furnace or fire used in connection with cupolas for melting metals, or to dwelling houses, except apartment houses.

2. No person shall incur a penalty for an infraction of this By-law until ninety days after notice from the Corporation of the existence of such By-law, and such notice may be given by publication of the By-law in The Ontario Gazette and in a daily newspaper published in the Municipality once each week for four successive weeks.

By-law Number 2583 amending By-law Number 2229 shall be and the said is hereby repealed.

PASSED this 5th day of April, A.D.1937.

(signed)
'E.J.Campbell'
CLERK

(signed)
'M.M.MacBride'
MAYOR "

- - - - -

"Re:Residents of Poplar Hills Survey
and Vicinity of Airport

We, the undersigned residents of the above area wish to complain to the Committee on Air Pollution about the very disagreeable and continuous odours emanating from the Airport Plant of Canada Packers Ltd. The odour at times is so strong as to necessitate closing the windows in our homes, owing to them allowing corn and other refuse to rot outside their buildings.

The fly menace is really serious to health and comfort, Our clothes on the lines are sometimes literally covered with a mass of large black flies.

Complaints have previously been made to Canada Packers, but have had no effect; in fact, they have laughed at them.

Therefore, we, the undersigned, wish to bring these complaints to your attention for action before the warm weather begins. Surely our children are worth this protection.

Yours truly,

<u>Name</u>	<u>Address</u>
(signed) S.C. Clegg	R.R. 4.
(signed) Mrs. S. Hicks	R.R. 4.

<u>Name</u>	<u>Address</u>
(signed) H. R. Scott	R.R.4
(signed) H. Denton	R.R.4
(signed) A. G. Bibb	R.R.4
(signed) Mr. F. Baetz	R.R.4
(signed) Don R. Doby	R.R.4
(signed) Mrs. J. A. Fellows	R.R.4
(signed) Mrs. C. Gretzky	R.R.4
(signed) Mrs. L. Brown	R.R.4
(signed) Mrs. Whiting	R.R.4
(signed) Mrs. Joyce Stewart	R.R.4
(signed) Mike Sirota	R.R.4
(signed) Mrs. June Smith	R.R.4
(signed) Mrs. A. Jones	R.R.4
(signed) W. B. Rodgers	R.R.4
(signed) Mrs. Frank Parker	R.R.4
(signed) L. R. Covey	7 Willowdale.
(signed) D. Gremster	R.R.4
(signed) Lloyd H. Poyser	5 Willowdale.
(signed) Mrs. B. Camisky	R.R.4
(signed) Mrs. A. Riches	R.R.4
(signed) Marvin C. Green	R.R.4
(signed) C. A. Marr	R.R.4
(signed) G. O'Sullivan	R.R.4
(signed) W. M. Young	R.R.4
(signed) Mrs. M. Burns	R.R.4

<u>Name</u>	<u>Address</u>
(signed) Miss Jean MacNeil	R.R.4
(signed) Mrs. Wm. Boutilier	R.R.4
(signed) Mrs. Jas. Golan	R.R.4
(signed) William Brady	R.R.4
(signed) Mrs. K. Whayman	R.R.4"

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MR. MACAULAY: In your own riding, Mr. Chairman, you have a roundhouse.

THE CHAIRMAN: Actually, on the edge of it.

MR. MACAULAY: Which is one of the biggest offenders in Toronto. I have heard there is a company in Toronto which has invented a small machine, and I would ask the Secretary to find out who they are. I understand this machine, if installed, in a roundhouse, will cut out all of this smoke and fly ash when the engines are fired up. This company apparently will install a machine in the roundhouse of the railway if the city of Toronto will pay a portion of the cost, and the railway pay a portion. I think the figure given for the test was \$5,000.

My last recollection of the matter is that the city of Toronto has indicated it is unprepared to make any contribution toward this, and until the city of Toronto does make some effort in that connection, I,

for one, do not feel they are very sincere in trying to get at the problem created by the railways.

We all agree that the engines have to haul the trains, and if there is equipment which can cut down the roundhouse contribution to this problem, I think it should be given a reasonable test, and I think that \$5,000. is a reasonable amount.

THE CHAIRMAN: One of the main purposes of this Committee is to convey to the municipalities the need for some measures to be taken in regard to the smoke and air pollution, and if, through our influence, we can make them understand the matter, they no doubt will do something about it.

DOCTOR EVIS (Secretary): I think you are referring to Mr. Baxter's Company. We read a newspaper article which he submitted to the Committee in- to the minutes, and at his request, Mr. Belyea, an engineer, with a great deal of experience in air pollution -- he is with our Industrial Hygiene Division -- was sent there to see and try out Mr. Baxter's equipment, on the 9th of June, and one point Mr. Belyea made is that in the United States the railway companies are preventing smoke from the firing of the engines in the roundhouses, with the aid of some equipment. I think they put some oil device into the boilers, and they can then fire

their boilers without producing smoke, and he said if our Canadian railways would adopt the same method, we could fire our locomotives in the roundhouses without producing smoke, which would be better than to try and remove the smoke after it is produced.

Here (indicating) is his report. Shall I read it?

THE CHAIRMAN: Yes.

DOCTOR EVIS (Secretary): This is dated June 9th, 1955, and reads as follows:

"A visit was made to observe test of smoke control device which Mr. Baxter is trying to sell to railroads for control of smoke at roundhouses and on diesels.

Conclusions

1. The equipment tested was an oil atomizing device.

2. The equipment intended for the railroads is a water tank separator."

In other words, Mr. Baxter described several types of apparatus to be used on different types of railway equipment.

This goes on:

" 3. An oil atomizing device could presumably remove coal smoke but would be ridiculously

prohibitive from a cost standpoint.

4. Water tank separator devices have never proven of any significant value.

5. During the test smoke was produced and eliminated alternatively but this could have been done in any of a number of ways and Mr. Baxter did not permit any one to inspect the equipment.

6. Railroad coal was said to have been used for the test but the smoke produced appeared to be an oil smoke.

7. At end of test all equipment was said to have been shut off and smoke emissions immediately ceased which would not likely have been possible if a quantity of coal had actually been fired."

MR. MACAULAY: Whose report is that?

DOCTOR EVIS (Secretary): Mr. Belyea's, an engineer with our department of Industrial Hygiene, who has had considerable experience with smoke equipment.

It goes on:

" 8. The amount of contaminant removed from his collector after burning 1500 pounds of coal was less than one pound although this amount of coal would have to contain from 50 to 150 pounds of ash alone.

9. Mr. Baxter had no information costs of

equipment or knowledge of smoke content or efficiencies. He had no knowledge of acid corrosion which occurs with wet type collectors handling effluents from fuels having sulphur impurities.

10. The exhaust stack temperature was stated to be 475 degrees which would undoubtedly vapourize or ignite any oil in an oil type filter.

11. Mr. Baxter is not an engineer as indicated under his signature on correspondence.

In our opinion, it is possible to use a washer to eliminate the heavy nuisance portion of a smoke from a coal burning unit, but the fine micron sized particles of soot, ash and the volatiles which cause the most damage would not be removed. The cost of equipment would be higher than equipment for producing complete combustion in the fire pot.

It is better not to produce smoke in the first place than to try to separate it later. It is a matter of simple engineering to light up a locomotive without smoke and therefore this approach to correcting the problem is the logical one."

MR. MACAULAY: He overlooks one problem. I know nothing about him, but he says it removes the fly

ash, that is, removing by some equipment the heavy substance, but there is still left in the air so much material which is of a very tiny nature. Is that right?

DOCTOR EVIS (Secretary): That is right.

MR. MACAULAY: That may be alright from the point of view of the lungs, but not from the point of view of keeping children clean, and the houses clean, and the lack of cleanliness is one of the greatest contributions to the decline in the standard of living.

It is all very well to say there is damage. That may be so. But if we can lessen the damage in any way by the use of any equipment, which will take the fly ash out of the air, that is a step in the right direction.

DOCTOR EVIS (Secretary): The point is there is material now being used in the United States which gives good combustion, and prevents this fly ash, which is very volatile.

MR. MACAULAY: We should see that.

DOCTOR EVIS (Secretary): Yes. Mr. Baxter had some pot-bellied stoves which were the source of smoke, but compared with the engines, it is rather insignificant.

THE CHAIRMAN: Mr. Baxter is coming before the Committee tomorrow, so we can question him, and get the information first-hand, at that time.

MR. THOMAS (Oshawa): It seems to me the

question of pollution is common in all cities and towns, and I do not think we will have the time to go into every nook and cranny, and see every situation.

It seems to me the job of the Committee is to make recommendations to the government to allow the municipalities to make regulations which would be enforceable.

I agree with Mr. Macaulay that we should present an interim report to the next Session of the Legislature, but we have four months in which to prepare that, and I think we have ample time.

It is our main job to recommend to the government the necessity of introducing legislation which will permit the municipalities to pass regulations enforcing that legislation.

MR. MACAULAY: Well, let us proceed, and do the best we can, but I think, in the end, we will find we cannot get all the material ready and available to prepare a complete report, but an interim report can be given.

Mr. Murdoch will remember we sat together on a committee with reference to erosion, and we could have brought in a report saying that if we just lowered the water, all our problems would be over, because the municipalities would appear to do this or that.

But the real important thing in connection with our problem is that we cannot wipe it out by legislation, but if any of these municipalities are given an illustration of what can be done, both by legislation and public education, then they can deal with it with a two-pronged fork, one by education, and one by legislation.

It seems to me we are here to secure and collate and present as much evidence as we can.

MR. THOMAS (Oshawa): The reason why the Committee on Erosion was delayed was because we thought it would impede or delay the St. Lawrence Seaway.

MR. MACAULAY: For one thing, we showed the municipalities how they could actually build groins.

I think we have some responsibility to produce to the municipalities a model by-law, to show them how they can get these industries in; to show the municipalities what we are doing, and how important it is to devise a method for solving the problem.

THE CHAIRMAN: It has just been brought to our attention that our Public Works Department invested several thousand dollars installing smoke equipment in the boiler room of the East Block. We might investigate that, as it is very close to home, and we could see what they have done.

MR. MACAULAY: One of the biggest offenders in the city of Toronto was the East Block, where the smoke used to just pour out, and it looked like a black silk hat, but with the introduction of the equipment they have considerably reduced that situation.

THE CHAIRMAN: Will you go on, Mr. Secretary?

DOCTOR EVIS (Secretary): The remainder of the first meeting was taken up with a discussion on Hamilton, Windsor and Sudbury. The proposed trip to Sudbury was discussed, but we were unable to make the trip, because of the election.

The second volume is pretty well filled with the testimony of Professor Allcut, which took place on the morning of the second day, and includes the questions put to him by members of the Committee, and his answers. .

Then, in the afternoon we made a tour of the Toronto east end, and looked at two factories there, one of which had installed a smoke collecting equipment of some kind.

MR. THOMAS (Oshawa): That was the Canada Metals?

DOCTOR EVIS (Secretary): Yes, the Canada Metals. They claim they collect an average of a ton of lead a day.

MR. MACAULAY: I thought it was 3,000 pounds.

DOCTOR EVIS (Secretary): They told us a ton. I suppose it does vary, per day, what goes out of the smoke stack.

MR. MACAULAY: Into my riding.

MR. THOMAS (Oshawa): The cost of that installation was \$35,000, but it proved very effective.

MR. MACAULAY: The Canada Coal and Tar; did you go there? I think they are thinking of putting in equipment, but it is expensive in their case, so they will have to consider it further.

THE CHAIRMAN: It is all expensive. That pretty well takes care of the report.

Although we did not have the authority, our Secretary visited Detroit, and the American Society of Air Pollution Control Association. As a matter of fact, we were all going except we were interrupted. Perhaps our Secretary could just very briefly give us some information in regard to that trip. He has a wealth of information on it, and he might just say a word which may be of interest concerning that meeting.

DOCTOR EVIS (Secretary): The proceedings of that meeting are in a large volume which is about one and one-half inches thick, and I have not had time to go through it and weed the meat out of it as yet. But I think the gist of it is that there are methods to

control practically every type of pollution except the exhaust from gasoline and oil-burning motors.

MR. MACAULAY: If I may interrupt, I recall an article in one of these FORTUNE magazines. I think it was in the May issue -- either April or May -- where there is a device which can be put on the back of motor cars, and which sells for about \$35.00, which will cut out the exhaust fumes.

DOCTOR EVIS (Secretary): I was talking with engineers from General Motors, Chrysler and the Ford Company, and they all agreed there was nothing available now which was effective for automobiles. The three major automobile companies began research around Christmas time of last year -- I think Ford started in February, 1955 -- and they all have an engineering staff now measuring exhaust fumes and trying to detect just what they are composed of, and are trying to develop a new carburetor system which will cut the pollution down to a minimum, and they think in a matter of two years, they can put out a carburetor which will cut the pollution in half.

MR. MACAULAY: In Los Angeles, they think that a great deal of the pollution is caused by the motor vehicles.

DOCTOR EVIS (Secretary): I think these large

companies tested the device you mention, because they said there were a number available, but they were not effective.

MR. MACAULAY: If there are, it should be brought to the attention of the members.

DOCTOR EVIS (Secretary): Apparently equipment is on the market not only for automobiles, but to control smoke from buildings, which will not do what is claimed for it.

MR. MACAULAY: I am sure that is right.

DOCTOR EVIS (Secretary): I think one of the difficulties is trying to find an effective improvement.

THE CHAIRMAN: Does this Association meet annually?

DOCTOR EVIS (Secretary): Yes. The next meeting will be held in Buffalo. There is a course being offered in New York, at Columbia University, in November, which I think will run for three or four days, and it is being given by experts on air pollution.

MR. MACAULAY: I would move we find out what it is, and see whether it is not possible for our Secretary to attend that meeting.

THE CHAIRMAN: And perhaps some of the members of the Committee would like to go to get the "dope" on it.

DOCTOR EVIS (Secretary): You will get a great deal of concentrated information, from these experts.

THE CHAIRMAN: Following up what our Secretary has said; as your Chairman, I took the liberty of visiting this Telegram bomb shelter we had in front of the City Hall in Toronto. I do not know whether any other members of the Committee were down there or not. I congratulated the Telegram on the job it was doing by bringing to the attention of the people of our community the need for giving some thought and study to actions in the event of some kind of controversy. Although it is not right on the question of air pollution, I think it is tied in closely enough to say it was a worth-while trip, and I went there on behalf of the Committee.

As I said before, I think the Telegram is to be congratulated on that venture.

Now, gentlemen, we have some correspondence here.

DOCTOR EVIS (Secretary): Mr. Oddie, who is the Associate Editor of "Heating and Plumbing Engineer" sent two photostats of graphs made on April 18th. What they did was to have a light meter at Malton, and a light meter in downtown Toronto on the same day, and

then graph the light intensity from the sun, and it is fairly clear that the smoke in Toronto cuts down the sun light to a great extent. He was supposed to mail some copies of "Heating and Plumbing Engineer" but so far I have only two. The one with the red cover is the one which shows the graphs.

MR. ELLIOTT: I think you will find some of the worst conditions going up and down the country roads, from the dust and gravel. It is worse than the air pollution in the cities.

THE CHAIRMAN: With your permission, we will go on with the correspondence, gentlemen.

DOCTOR EVIS (Secretary): On April 25th, I received a letter which was written anonymously. Shall I read it?

MR. MACAULAY: I think we should not pay too much attention to anonymous letters.

DOCTOR EVIS (Secretary): This (indicating) is a letter Mr. Macaulay sent in, and has some information about W. A. Caunt, 45 McEwen Avenue, Windsor, Ontario. He is a consultant on fuels and combustion.

THE CHAIRMAN: We will be going to Windsor and can see him then.

DOCTOR EVIS (Secretary): Mr. Macaulay wished

to have two ladies from Logan Avenue appear, and I notified them to come this afternoon.

Mr. Harold Fishleigh, M.P.P., wrote a letter, in which he said:

" I am writing on behalf of the people on Greenwood Avenue backing into the brick yards just north of the railway tracks.

I am told by the residents that they have enough clay to last fifteen years. The dry kilns on Greenwood Avenue emit volumes of black smoke making it impossible for my constituents to hang their washing outside, but worse than the smoke is the dynamiting that goes on all day long. By law they are only supposed to explode one stick at a time but I am told they bore four holes and let the four sticks off at one time which fairly knocks one out of bed with the blast.

This nuisance has been going on for years uncontrolled by the city but at one time they promised to only blast at certain hours.

Hoping that the committee will give the blasting and smoke nuisance full consideration."

I do not know whether we can consider noise in the air as "pollution".

MR. MACAULAY: I do not think so. I think it

is more of a public nuisance.

I notified Mr. Fishleigh about this meeting, and said we would welcome evidence from his constituents this afternoon. He said he would get in touch with some of the people.

I also had a letter from a Miss Eryl Levers, which reads:

" I am writing on behalf of the Toronto Peace Council to request the opportunity for a small delegation from the Council to meet with the Provincial Committee on Air Pollution and Smoke Control.

We are greatly concerned about the effects of radiation from atomic explosions on human beings, and we understand that your committee is studying in particular its relationship to cancer.

We should greatly appreciate your granting us an interview on the week of June 13, if possible."

I notified her about the meeting and she said they did not have enough notice to get the committee together but they will submit a written brief later on.

MR. MACAULAY: That will be better. They are a Communist outfit. The thing in which they are interested is not everybody's health, but in trying to cut down the atomic research in this country.

DOCTOR EVIS (Secretary): I also had a letter from Mr. J. C. Dye, Chairman for Smoke Control, of Brockville, Ontario, who said they were having some difficulty down there with one factory, which would not co-operate in regard to smoke control, and asked my advice about a by-law, and I sent him a three-page letter trying to give him some direction, and also sent Mr. Belyea to Brockville. The letter reads as follows:

"Dear Mr. Dye:

In reply to your enquiry concerning smoke control, I would suggest you recommend to your municipal council the passing of a Smoke and Air Pollution Control By-law. This by-law, while directed at the outset to your immediate problem of the elimination of visible smoke, should be worded in broad enough language that it will make control of other air pollutants possible in the future, if and when necessary. While visible smoke itself is a definite annoyance, it is very probable that the less obvious products of combustion, such as sulphur dioxide, oxides of nitrogen, hydrocarbons like benzpyrene, aldehydes, etc., are the ones which will be the cause of any detrimental effects on health which may be produced by the pollution of the atmosphere over your city.

Enclosed you will find a copy of the permissive provincial smoke and air pollution control legislation. Your by-law should be passed under the provisions of Section 399 of the Municipal Act. While this authority as it stands is not perfect, it, nevertheless, should be sufficient to enable Brockville to pass an effective by-law.

You do not state the type of factory which is causing the nuisance and refusing to co-operate for the good of the municipality. If it happens to be one which comes within the group listed in subsection (4) of paragraph 9 of Section 399, (e.g. a mineral refinery or a brick works), then an additional procedure is required to make the by-law applicable to the industry. This method is set out in subsections (5) and (9) of paragraph 9, on page 4. It is cumbersome but, if the municipality carries through with the procedure, it should be effective.

One of the purposes of the Select Committee of the Legislature on Air Pollution and Smoke Control was to investigate the legal situation and to make recommendations for the improvement of our existing legislation. Unfortunately, the

committee barely began to function when the election announcement automatically dissolved it. It cannot carry on any further until the House sits again and the committee is re-appointed. It was also hoped that the committee would make a study of representative Canadian by-laws and American ordinances on the subject and draw up a suggested standard model by-law which could be made available to municipalities seeking guidance in the matter. Of course, there was no time for this work to be done either.

With regard to the other questions in your letter, I am sorry to say that we do not have copies available of by-laws used by various other Ontario communities. Sample by-laws could probably be obtained by writing to Toronto, Hamilton or Brantford. Perhaps you might care to visit Mr. Joe Reid in Hamilton who is in charge of the enforcement of their by-law, and Mr. J.B.R. Neilson who performs the same function in Toronto. Either one, I am sure, would be happy to make helpful suggestions and give you the benefit of his experience in this field.

The Division of Industrial Hygiene of our Department of Health also has an engineer, Mr.

Harry Belyea, who is well acquainted with both the practical and engineering aspects of air pollution control. When you are in Toronto to see Mr. Neilson, an opportunity could be provided for you to discuss the matter with Mr. Belyea, and obtain whatever advice he can supply.

Several Ontario municipalities have passed smoke control by-laws but there is little uniformity in approach to the problem, and, therefore, consulting too many would probably lead to confusion. The degree of success achieved by each one depends partly upon the provisions of the particular by-law passed, but mainly upon the following factors:

1. How much money is provided by the municipality for enforcement personnel and equipment;
2. How well informed the enforcement staff members are on the subjects of combustion engineering and methods of control for various types of installation and contaminants to be controlled.
3. How alert and hard working the enforcement staff are.

I am sorry there is no ideal sample by-law which I could send for your guidance. However,

Section 399 of the Municipal Act will show your City Solicitor what he may include in the by-law, and it is up to the council just how far it wishes to go, and how much it wishes to enact at this time.

If I can be of any further assistance, please write again."

Mr. Belyea saw the factory people and managed to get their co-operation without resorting to law.

MR. MACAULAY: That proves the value of research into ways and means other than by legislation.

DOCTOR EVIS (Secretary): Mr. Bernard, of the Canadian Manufacturers Association, asked to be advised about the Committee when the Committee was re-appointed, and I gave him the names of the members, and so forth. He said:

" Thank you for your letter of September 13th in which you give me particulars on the Select Committee on Air Pollution and Smoke Control.

We shall be happy indeed to publicize the Committee and invite our members to submit their views to it. We are suggesting to them that if they would like to do so through this Association we will be glad to render any assistance we can.

I also enclose a clipping from the Hamilton Spectator of September 15th which gives some

indication of the very large programme they have there for conducting a survey under the auspices of the Hamilton-Brantford Branch of this Association. You might care to draw this to the attention of the Committee.

Assuring you of our co-operation,"

He enclosed a clipping from the Hamilton "Spectator" of September 15th, giving some indication of the large programme they have in Hamilton for conducting a survey in the Hamilton-Brantford Branch of the Canadian Manufacturers' Association.

I also had a letter from Mr. R. W. Neal, the Manager of the Hamilton-Brantford Branch, and he said the cost of the Hamilton survey is estimated at \$130,000, and this amount has been voluntarily subscribed from manufacturers and industries in the Hamilton-Brantford area. Reports of the progress of the survey will be made periodically, as the results of this research warrant.

He said when the Committee goes to Hamilton, they will welcome it, and shall be glad to show the Committee what is going on. I do not know whether you want me to read this clipping or not.

MR. MACAULAY: Where is the Headquarters of the Canadian Manufacturers Association?

DOCTOR EVIS (Secretary): 202 Imperial Building, Hamilton.

MR. MACAULAY: Is that for all Ontario?

DOCTOR EVIS (Secretary): No, that is at 67 Yonge Street.

MR. MACAULAY: Do you not think, in view of that, we should ask these people to come before us, which is so much better than having written briefs?

THE CHAIRMAN: I think that is a good suggestion. I think if we had some of their communications, we could then invite them here, and talk to them about the briefs submitted. We will give them a little time.

DOCTOR EVIS (Secretary): Mr. Cowling (Chairman) received a letter from the Royal Military College at Kingston, written by Mr. B. G. Hogg, dated April 22nd, 1955, which reads as follows:

" I understand that your committee is making a study of radioactive fallout from nuclear experiments.

A group at the Royal Military College have been conducting experiments since 15 February and have data on the situation in Kingston to the present. Our experiments have been done using a standard type of sampling technique and a definite counting geometry and should be internally

consistent.

If you are interested I should be happy to send to you a copy of a graph drawn from the data. We would also like to receive any information that you may have from other sampling stations in Ontario."

THE CHAIRMAN: I think we should invite him to be here, too.

MR. MACAULAY: We may be going through there, may we not? If we go to Brockville, we could stop off and see them.

DOCTOR EVIS (Secretary): I asked Doctor Colley, Director of our Dental Services, if he had any information about the effect of air pollution on teeth. I think it does affect them in some communities where chemicals go into the air. He sent a report, which we can put into the minutes.

MR. MACAULAY: Where is he from?

DOCTOR EVIS (Secretary): From Toronto, from our own Department.

MR. MACAULAY: Why not wait and call him?

DOCTOR EVIS (Secretary): Alright. I also asked Doctor Sellers, our Medical Statistician, to compile some statistics about the effect of air pollution in the city in regard to health, in cancer in particular, as compared with the rural areas. He

will be here tomorrow to discuss his problem.

Apparently the difficulty is the Dominion Bureau of Statistics does not separate the city from the country, unless they make a special study of it, and it is difficult to get exact statistics which we want.

I wanted him to compare cancer, both in Toronto, Windsor, Sudbury, and places like that, with the rural areas, but apparently they did not have the figures broken down in that way. But he managed to "dig out" something, and will come tomorrow and present what he has.

There was a letter sent to Hon. Leslie M. Frost, Q.C., from Mr. L. R. Barrand, City Clerk of Oshawa, in which he said:

" It was brought to the attention of Oshawa City Council, at their meeting July 4th, that your Government is to appoint a special committee to study the matter of smoke abatement.

We have received many complaints in Oshawa of smoke and soot emanating from the various industrial plants in the city and very little has been done to control this nuisance.

The Oshawa City Council would be pleased if your Committee, when studying the matter, would

take into consideration the nuisance that exists in the city of Oshawa and suggest what might be done as a solution."

MR. MACAULAY: And the hospital is one of the biggest offenders in Oshawa.

MR. THOMAS (Oshawa): I think the City Council should do a little work themselves, and not "pass the buck" to this Committee. Some bright soul on the Council, apparently has said, "We will 'pass the buck' on to the Committee".

DOCTOR EVIS (Secretary): They asked us if we would go down and make a study of the situation.

I think that is everything up to date.

THE CHAIRMAN: There is a communication here which was not read the last time, but which might be read now.

MR. MACAULAY: May I make another observation? I think it would be a great deal easier for this Committee, if we obtained a loose-leaf notebook, and put all the letters in, in the order in which they are received, and then every member will have them available, rather than have them lying around loosely. Then anybody who wants to, can come up to your office and can leaf through them.

I am interested in reading these, and it

will be much less trouble for you.

DOCTOR EVIS (Secretary): This (indicating) is addressed to Mr. Cowling, from Mr. E. J. Young, Executive Assistant to the Prime Minister, and reads:

" For your information please find enclosed original letter from Professor A. E. Allcut of the University of Toronto, Department of Mechanical Engineering, together with copy of the address therein mentioned."

Then there is a copy of a letter to Professor Allcut, from Mr. Young, which reads as follows:

" I have been requested to acknowledge your letter of April 30th, together with the attached copy of address 'Air Pollution Control in Canada', and to thank you for sending this.

The liberty has been taken of sending a copy of your letter and attachment to Mr. A. H. Cowling, Chairman of the Select Committee on Air Pollution and Smoke Control, for his information."

The letter from Professor Allcut to Honourable Leslie Frost, Prime Minister of Ontario, reads as follows:

" I note that Mr. Dunbar is quoted in the 'Globe and Mail' (March 29th, 1955) as saying that the proposed Smoke Abatement Law contained only

what Toronto had requested. This is not correct as, for several years past, the Air Pollution Advisory Board has protested vigorously against the exemptions contained in the existing Act and has asked for their removal. Also, I have personally called attention to this fact on numerous occasions on the C.B.C., in published papers and public lectures, all of which have been prominently mentioned in the Toronto and Canadian press. Mr. Dunbar can scarcely be ignorant of this fact.

Appended hereto is a paragraph from the 1953 report of the Toronto Smoke Abatement (now Air Pollution) Advisory Board quoting a letter sent by me to Mr. Gardiner on June 4th, 1953. I am also sending herewith a copy of a paper read by me on 'Air Pollution Control in Canada', published in the Engineering Journal, March, 1954, in which this matter is referred to on page 5."

Then, attached to that is an excerpt from a letter to Mr. Gardiner, dated June 4th, 1953, which reads as follows:

" I offer the following suggestions for your consideration and criticism:

(1) That a by-law or other appropriate

ordinance be drafted to cover all aspects of atmospheric pollution and to include the whole of the metropolitan area. I do not know what legal steps must be taken to bring this about.

(2) That, until such legislation is available, the present organizations and personnel be retained, but that the jurisdiction of the Toronto Board be extended to cover the whole of the metropolitan area.

(3) That any new legislation should be free from the exemptions now allowed to certain industries, so that uniform administration may become possible.

This is purely a personal approach and is by no means official, but if you think favourably of the idea I shall be pleased to see you and to discuss matters of detail.'

To this letter and suggestions, no reply has been received, but we learn from the press that a motion will shortly be considered to extend and widen the provisions of existing legislation to cover the entire metropolitan area."

MR. MACAULAY: May I say that Professor Allcut asked the city of Toronto for \$16,000. or \$20,000. to be set aside for the purpose of maintaining a mobile laboratory, which could go around the city, and make the

proper findings. He had to resign to get any money at all. He resigned, and then the city made available to him \$4,000. or \$5,000, which was desperately needed.

They have not come up with the rest, and there is no mobile laboratory available for the proper carrying out of the functions of the Smoke Abatement Board, in Toronto, and again the city of Toronto appears prepared to "pass the buck" to the Ontario Government, or some other than their own shoulders, in connection with this problem.

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MESSRS. C. PULLAN, A.E.ASHMAN AND C. WILMOTTE,
appeared before the Committee, representing the residents of a certain portion of Greenwood Avenue in the city of Toronto, and who not being sworn, depose and say:

MR. PULLAN: We are here, Mr. Chairman and gentlemen, in connection with the letter you received from Mr. Fishleigh. We are residents of Greenwood Avenue, and we are complaining about the continuous smoke coming from the Toronto Brickyards in our area.

MR. MACAULAY: What is your address?

MR. PULLAN: I cannot give you the exact address. I am at 459 Greenwood Avenue, and the plant is about four doors below me.

MR. ELLIOTT: Do you all live in that area?

MR. PULLAN: Yes. We have to put up with the smoke seven days a week, and twenty-four hours a day, and from what we can gather, there was evidently some complaint in the Bayview district, where the Toronto Brick Company also operates, and since that time they have been trucking loads of raw brick down -- they come down day and night -- and they are baking them in our area, so we get double the amount of smoke all the time. That is simply adding insult to injury, as far as we are concerned.

MR. MACAULAY: How does it actually affect you? In what way?

MR. PULLAN: Well, I believe a woman could give you a better picture of that. I heard you mention earlier something about washing having to be taken in. My wife takes in her washing many times, and has to put it through the machine again, and do it over. If the smoke is coming your way, you get the full blast. Every house gets it at times.

MR. MACAULAY: Have you had any experience in trying to paint your home?

MR. PULLAN: The house is black again in no time at all. I happen to be in the decorating business myself, and it hardly will be a year, before it is all

filthy again.

MR. ASHMAN: Not only on the outside, but on the inside as well.

MR. MACAULAY: Does this keep up in the summer time or do the screens keep it out?

MR. PULLAN: Oh, no.

MR. MACAULAY: So you can either close your windows and boil to death, or open the windows and look like coal miners.

MR. PULLAN: People in the district will "get it" on the days the wind blows in their direction. It is constant -- every day in the week.

THE CHAIRMAN: Do you represent any rate payers' group?

MR. PULLAN: We received a letter from Mr. Fishleigh to come down here and hear what is going on.

MR. ELLIOTT: Was the brick works there first, or the residences? I think there was something wrong with the planning, as it should have been set aside for some light industries, instead of housing.

MR. PULLAN: I can see that.

MR. ELLIOTT: It is in the old part of the city of Toronto?

MR. MACAULAY: It is beyond the Don River, about a mile or so. The Brick Company has been there

quite a time.

MR. PULLAN: Oh, yes.

MR. MACAULAY: It is completely built up around there.

MR. PULLAN: Yes, across the park, and all the way around. We have friends on the other side of the street, and they all get the same medicine.

The thing which really made us speak with Mr. Fishleigh was when they started to bring their raw brick into the yard.

MR. MACAULAY: They are avoiding the problem for the rich, and bringing it down to your neighborhood?

MR. PULLAN: That is about the size of it. We are residents, and pay taxes the same as anybody else,-- perhaps not as large, but on the same percentage, as far as we are concerned. It is just too much.

I noticed the picture which was passed around showing the smoke coming out of one of the chimneys. I was wondering if there was anything which could be done to filter that in any way.

THE CHAIRMAN: I think they can do something.

MR. ASHMAN: The stacks are so low. There is only one high stack. There are about a half a dozen stacks there.

MR. MACAULAY: If you carry the stacks up, the

only difference is it will fall on somebody just that much farther away.

MR. PULLAN: I do not think that is the answer. If they are going to remain there, the only answer I can think of is some sort of a system to prevent it belching out so much.

THE CHAIRMAN: They are one of the groups not included in the city by-law.

MR. PULLAN: I realized that, when I read it in the papers. I do not know if anything can be done. Mr. Fishleigh sent a letter on suggesting we should come down.

THE CHAIRMAN: That is part of our job.

MR. ELLIOTT: It is our job to help industry eliminate a nuisance.

MR. PULLAN: I think that is about all we have to say.

MR. ELLIOTT: I think it is good of you to come down and give us the picture. You would like the brickyard to stay there, to give employment to people, but you would like to see the smoke eliminated?

MR. PULLAN: If the brickyard goes, then we have another bad one on our hands, and that is the garbage dump.

MR. MACAULAY: Is that the city incinerator

or a garbage dump?

MR. PULLAN: If the brickyard goes, there will be a hole there and it will have to be filled up.

MR. ELLIOTT: Is the brickyard about due to go?

MR. PULLAN: It is hard to say.

THE CHAIRMAN: According to the letter we received from Mr. Fishleigh, they have enough clay there to last them for fifteen years.

MR. PULLAN: They cannot go any farther north, and it is all filled to the south. To the south, they are very nearly against the railroad tracks, and on the far side, they are bordering on Monarch Park.

MR. MACAULAY: Is that a recreational area set aside by the city, in which the children can play?

MR. PULLAN: Yes.

MR. MACAULAY: It is a delightful (?) place, is it not?

MR. PULLAN: One other thing. I know it does not hit your field, but you mentioned the dynamiting. That is terrific in itself. In the winter time, when the ground is harder -- I do not know how much they put in, but I have been in the house, and it has shaken badly, when they "let it go".

MR. MACAULAY: How many times a day does the

blasting go on?

MR. PULLAN: I counted six in one morning alone.

THE CHAIRMAN: They are blasting continuously?

MR. PULLAN: Yes. Maybe they are putting in more than they should, but it does make terrific blasts.

MR. BRANDON, Q.C.: Mr. Pullan, in regard to the matter of blasting; do you have any debris damaging the homes, aside from the vibration?

MR. PULLAN: No, they would be too far down, I imagine.

MR. BRANDON, Q.C.: Is there not any dust or debris?

MR. PULLAN: It is mostly the concussions. It does crack up the houses. I can show you places where it has cracked as fast as I could repair it.

MR. MACAULAY: Does the wind pick up much dust out of the pits, and swirl it around?

MR. PULLAN: I would say that does happen.

MR. MACAULAY: Following the question asked by Mr. Brandon, is there any cracking in the houses from the vibration?

MR. PULLAN: Yes. I did my bathroom, and before the winter came on, the blasting started, and it opened it up all the way around the corners. The

kitchen ceiling has been cracked on several occasions. It is not just ordinary cracking.

THE CHAIRMAN: The only nice thing about it is it is good for your business?

MR. PULLAN: To tell you how tough it is to do anything from that angle; a neighbor just across the park up in that area had his whole ceiling fall down, and he tried to get damages but even with the help of a lawyer, he could not get to "first base".

MR. ELLIOTT: How old would your house be?

MR. PULLAN: I think somewhere around twenty-five or thirty years.

MR. ELLIOTT: In other words, they have been built since the First War?

MR. ASHMAN: Oh, yes.

MR. PULLAN: There is the Bell Telephone across the way, and the Wonder Bread up a ways, and a lumber yard down there. We do not have any trouble with them at all.

MR. MACAULAY: You have no complaint about any industry except the brick yard?

MR. PULLAN: If it was not there, I would not have a "beef" in the world.

THE CHAIRMAN: We would like to assure you that your member, Mr. Fishleigh, has brought this

condition to the attention of the Committee, and he is coming before the Committee to speak. He is "on the job" on your behalf.

We thank you for taking the time out to come down and tell us your story, and it will be given every consideration.

MR. PULLAN: I thought it was this afternoon you would be hearing people.

MR. MACAULAY: No, we are happy to have you here.

---Messrs. Pullan, Ashman and Wilmotte retired.

THE CHAIRMAN: In order to expedite things, we have arranged to have some food sent in to Committee Room No. 1 at half-past twelve, so we can have a little snack, and get back at two o'clock.

So the time is open for the next few minutes if anybody has anything to say before we adjourn.
(No response).

If not, the meeting will stand adjourned until two o'clock.

---Whereupon at 12:11 of the clock, p.m., the further proceedings of this Committee adjourned until this afternoon at two o'clock.

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A F T E R N O O N S E S S I O N

Toronto, Ontario,
Tuesday, September 20th, 1955,
2:00 o'clock, p.m.

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The further proceedings of this Committee
reconvened pursuant to adjournment.

Mr. A. H. Cowling, Chairman,
Presiding.

PRESENT:

Messrs. Brandon, Q.C.,
Murdoch,
Morningstar,
Elliott,
Macaulay,
Gordon,
Thomas (Oshawa)

Hon. Mr. Kelly

Dr. Frederick Evis (Secretary).

APPEARANCES:

Mr. J. M. Baxter
Mr. Duncan Heriot
Mr. Donald Gordon

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THE CHAIRMAN: Gentlemen, let us come to order. It has been suggested, rather than have so many pamphlets and magazines lying around, that we try to confine our studies to two files, one in the report, and one in the file of correspondence. It will be easy for any of us then to refer to one of the two. Then any of the articles which any members of the Committee think would be of interest, will be read into the record, and will be there for perusal, when you get time. We think it will be much better than to have so many articles around, trying to keep track of them.

MR. MACAULAY: As long as you remind the Reporter to take out this article entitled "Garbage in the Sky" starting at page 142 et seq of Fortune Magazine, the April issue, and have it appear as part of the minutes.

Then there are two others. I think if you asked Mr. Oddie, you might find that he has written four or five articles in the last five months, of which you only have two, Mr. Secretary.

DOCTOR EVIS (Secretary): I have three.

MR. MACAULAY: I think, if I may, with respect, suggest, he might be asked if he has written any others recently, and if so, to secure copies, and

they may be then placed in order of date of publication and can be included in the minutes.

They might all go in as an Appendix to the minutes, or something of that kind.

---Article entitled "Garbage in the Sky", page 142 et seq Fortune Magazine, April issue, admitted as part of the record, and appears as Appendix "A" following these proceedings.

---Article entitled "Smoke Prevention is your Business" from the March, 1955, Heating and Plumbing Engineer, admitted into the record, and appears as Appendix "B" following these proceedings.

---Article entitled "Foul Air Kills Men and Eats Dollars", from the March, 1955 issue of Heating and Plumbing Engineer, admitted into the record, and is incorporated with Appendix "B" following these proceedings.

---Article entitled "Wider Control of Air Pollution urged in two Cities" appearing in the March 1955 issue of Heating and Plumbing Engineer, admitted into the record and incorporated with Appendix "B" following these proceedings.

---Article entitled "Smokeless Stacks send Profits Soaring" from the May, 1955 issue of Heating and Plumbing Engineer, admitted into the record, and appears as Appendix "C" following these proceedings.

---Article entitled "City Smoke Screens hide Air-borne Killers" from the July, 1955 issue of Heating and Plumbing Engineer, admitted into the record, and appears as Appendix "D", following these proceedings.

THE CHAIRMAN: Perhaps we might hear from Mr. Baxter at this time. I will ask him to come forward

and we will hear what he has to say now.

J. M. BAXTER,

residing at No. 286 Main Street, Toronto, Ontario,
appearing before the Committee, but not being sworn,
deposes and says:

THE CHAIRMAN: I understand Mr. Baxter has
a machine which eliminates smoke and soot.

THE WITNESS: Fly ash and soot.

BY MR. MACAULAY:

Q. In connection with the railroads?

A. I have a machine for the railroad smoke, up
at the roundhouses.

Q. Subject to what the Chairman has to say on
the subject, I would like to hear you in regard to
these roundhouse machines. What is that?

A. It cuts out the black smoke from the locomotives
in the roundhouses. As the smoke leaves the engine,
it goes into what we call the "breaching" of the stack.

BY MR. ELLIOTT:

Q. Do you manufacture this machine?

A. Yes.

Q. You have a plant in Toronto?

A. Yes.

Q. You are not manufacturing it now?

A. No, but it is ready, if anybody wants it.

Q. There apparently is no market for it?

A. No enforcement law, yet.

Q. What about the gases from fuel oil?

A. Fuel oil has a gas, and there is gas in the houses, too. It is the automobile gases which have not been harnessed as yet, and which get out into the air.

Q. Will you go ahead and explain your machine?

A. I cannot do any more than to say that as the smoke comes out of the stack --

BY MR. MACAULAY:

Q. You have a machine?

A. Yes.

Q. Now, go on from there.

A. When the smoke comes up into what we call a "pipe", that goes to the chimney, and our machine takes hold, and cuts out the black smoke, and leaves just the vapour.

BY MR. THOMAS (Oshawa):

Q. Sort of a filtration?

A. Yes.

Q. How much would the machine cost?

A. It depends on the size of the plant.

Q. Are there any in operation now?

A. No. The railroads will not put them in until they are forced to.

BY THE CHAIRMAN:

Q. Could you tell us if you have had any practical experience with any of the roundhouses? For instance, let us consider the Runnymede roundhouse, which is the one in which I am personally interested. They have twenty-eight or thirty vents, where they drive in, and the smoke goes out the chimney. What would it cost to install your machine to take care of twenty-eight or thirty locomotives?

A. We took a survey, a year this past March.

Q. At Runnymede?

A. Right, sir. And we were ready to go ahead, when York Township could not supply the money.

BY MR. MACAULAY:

Q. How much money was to be supplied?

A. \$5,000.

Q. Was that for one stack? Was it a test for one machine?

A. A test for all the engines passing through this machine.

Q. Was it for one stack?

A. No, taking all the engines together. But the Canadian Pacific Railway would not put it in.

It was going to cost the Canadian Pacific Railway approximately \$75,000.

Q. For the whole roundhouse?

A. Yes.

Q. This \$5,000 was for one stack?

A. Yes.

Q. You carried out a test there?

A. No.

Q. Have you ever tested your machine with an engine?

A. No. We made a test before that. The York Township Council wanted one to force the hand of the Canadian Pacific, but they could not raise the money.

Q. Let us get down to the point about which I asked you. Do not worry about who would raise the money. Have you ever tested this machine?

A. On a locomotive?

Q. Yes.

A. Yes, we have.

Q. Where?

A. At Runnymede.

Q. When?

A. Two years ago.

Q. About what date, sir?

A. I cannot say. I would have to find out. It

was not official.

Q. I do not care whether it was official or not. I asked you if it was ever tested, and you said "Yes, two years ago". That would be in the spring of 1953?

A. Yes.

Q. And were the other officials there?

A. There was no Canadian Pacific official there at all.

Q. You were not alone there?

A. Just the two of us there.

Q. Who was with you?

A. One of our men.

Q. What is his name?

A. Let me see which one it was, now. Anyway, he was only a helper.

BY THE CHAIRMAN:

Q. I think the Committee is interested in anything that is going to eliminate smoke and air pollution. Can you briefly describe your machine, and tell us what it will do.

A. It will take the smoke from the locomotives, and pass it through the chimney and the stack, so that only a greyish white smoke remains, with no sulphur or fly ash.

Q. They can build up a fire in a locomotive and leave the black smoke come out of the locomotive as much as it likes?

A. Yes.

Q. And when it comes out of the chimney, your machine removes the fly ash?

A. Yes.

BY MR. MACAULAY:

Q. What are the component parts of the smoke put out by the engine?

A. The different parts of it?

Q. Yes.

A. I am not a university engineer. I am a railroad engineer.

Q. What are the general components? Even I know there is fly ash. That is one. What else is there?

A. There is soot.

Q. What is the difference between fly ash and soot?

A. Fly ash is heavier than soot. Soot you can burn.

BY MR. THOMAS (Oshawa):

Q. The soot is carbon, and can be burned?

A. Yes.

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BY MR. ELLIOTT:

Q. It is part of the coal fuel?

A. Yes.

BY MR. THOMAS (Oshawa):

Q. Your mechanism is mainly concerned with filtration?

A. Filtration and dissolving?

Q. How would it dissolve?

A. That is the secret. I cannot tell you myself. I say it does it.

BY MR. MACAULAY:

Q. If this was installed for one stack, as a test on one engine, the machine for that one stack would cost, say, about \$5,000?

A. That is right.

Q. And it would remove the soot by dissolving it, and remove the fly ash? Is that right?

A. That is right.

Q. Does it remove anything else?

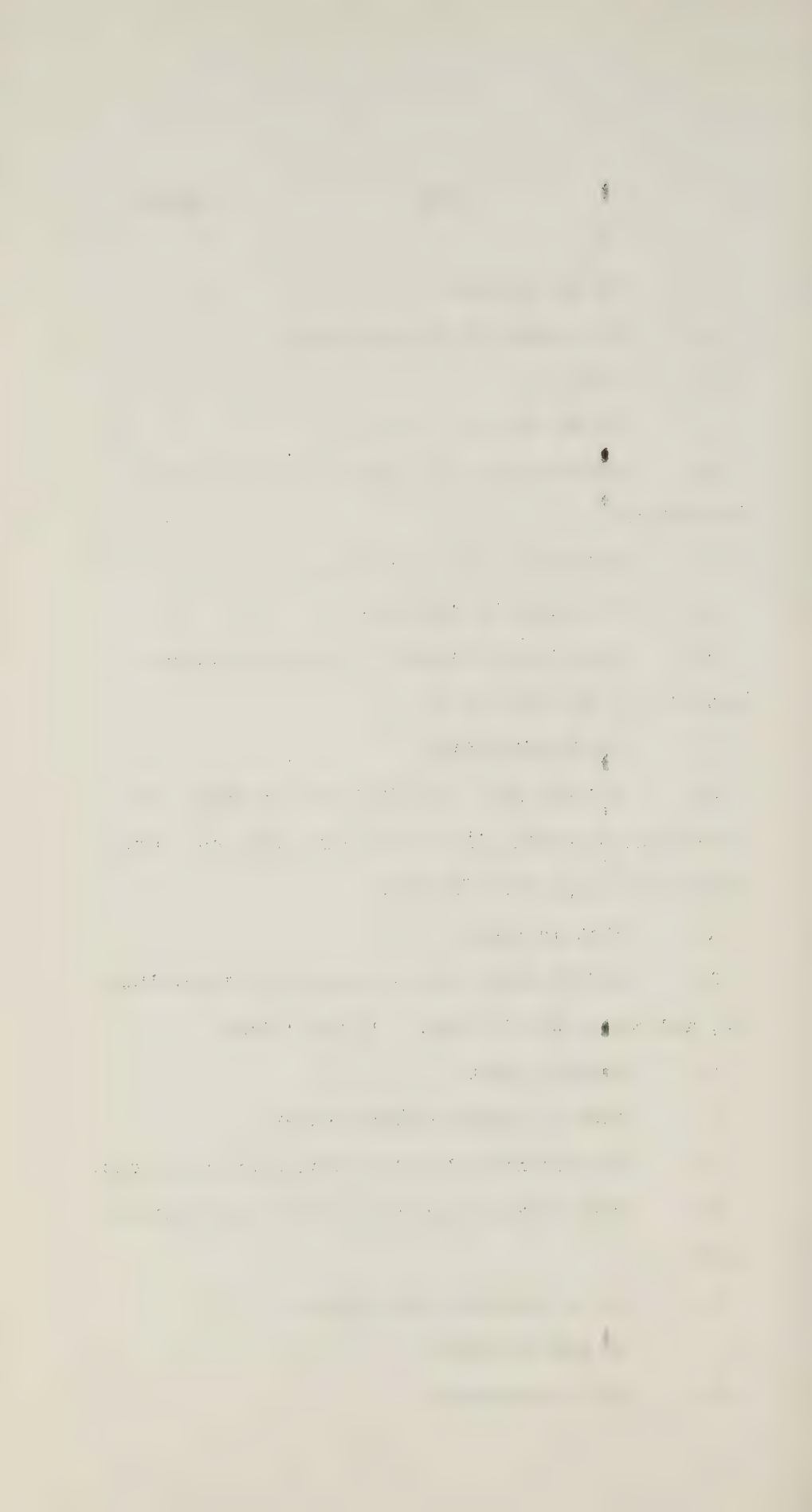
A. We have never tried it with poisonous gases.

Q. What is the composition of the soot that is left?

A. It is a greyish white smoke.

BY THE CHAIRMAN:

Q. Is it poisonous?



A. Well, I have put my face over it, and it did no harm.

BY MR. THOMAS (Oshawa):

Q. There would not be very much difference in the colour. One of the reasons, it seems to me, why there would be opposition to this mechanism would be the discoloration. I think many manufacturers would be interested in some kind of mechanism which would dissipate the smoke.

BY MR. MACAULAY:

Q. I am trying to get a little bit of information.

A. I am not trying to hide any secrets.

Q. When the smoke comes up into your machine, does the soot and fly ash dissolve, or does it have to be carted away in cans?

A. No. Anything which passes this machine -- just before it reaches the stack, it is knocked into the base of the stack.

Q. Which you cart away?

A. Which you shovel away from the base of the stack in a wheelbarrow, if you want to.

BY THE CHAIRMAN:

Q. So far we have confined ourselves to locomotives. There are a number of industries which come under the Toronto Smoke Abatement By-laws; have any of these

people approached you for assistance in their problem?

A. No, there is no law enforcing that.

Q. There is a law enforcing many industries.

A. It is not enforced. When we go to them, they say, "We do not have to do this".

BY MR. MACAULAY:

Q. They do not have to use your equipment, but at the same time, they are in favour of putting anything on, which will stop this smoke going into the air?

Do we have a report on the test of this equipment?

DOCTOR EVIS (Secretary): That is right.

MR. MACAULAY: I see that some of this equipment consisted of an oil atomizing device. Is that it?

THE WITNESS: No.

MR. MACAULAY: And it says "The equipment intended for railroads is water tank separator".

THE WITNESS: No. If anybody comes down to make a test, they do not say they are coming to make a test.

BY DOCTOR EVIS (Secretary):

Q. This is Mr. Belyea's report?

A. Yes, but he did not say he wanted to make a test or take a single thing.

BY THE CHAIRMAN:

Q. Did you make a test?

A. I made about twelve tests altogether for the Canadian Pacific engineers, and some engineers from the States, Controller Shannon, and Alderman Lipzig was there.

Q. Then this was several years ago?

A. Just before Controller Shannon passed away.

Q. Was that the one Mr. Belyea was at?

A. No, he never said he came down for a test.

BY MR. MACAULAY:

Q. Were you there when Mr. Belyea was there?

A. Yes.

Q. What did he do?

A. He just looked for smoke.

Q. He asked to see the workings of the machine and you said it was a secret?

A. No. I think he said he wanted to operate the machine. I said, "Later, we will give you the privilege and honour of operating the machine".

Q. So you have never conducted a test for the railways, with Mr. Belyea there?

A. No. We made a test for the railroads and different ones -- four engineers, and their lawyer.

DOCTOR EVIS (Secretary): This test was not

made for the railroad. It was made in Mr. Baxter's plant.

MR. MACAULAY: But Mr. Baxter says it was not tested.

THE WITNESS: Just for the smoke.

BY MR. MACAULAY:

Q. So it was being tested?

A. Yes, and Mr. Belyea saw the inner workings.

Q. It was tested for smoke?

A. Yes.

Q. He said what he tested was the oil atomizing device.

A. He never tested anything.

BY DOCTOR EVIS (Secretary):

Q. That is what you told him.

A. He never tested anything.

BY MR. MACAULAY:

Q. You said you carried out a test for smoke?

A. Yes.

Q. Was the machine operating on oil?

A. Not that day.

Q. Could it be properly called a "oil atomizing device"?

A. No.

Q. Could it be called a "water tank separator"?

A. Partially, yes.

BY DOCTOR EVIS (Secretary):

Q. How did you get the explosions if you were not using oil?

A. I think about two years before that, we used oil.

Q. He said you were getting little explosions on that same day?

A. No.

BY THE CHAIRMAN:

Q. At any rate, have you any proof, Mr. Baxter, that this machine operates successfully?

A. The Canadian Pacific had two tests, and they were willing to go ahead and put the big breaching in up at Runnymede.

BY MR. MACAULAY:

Q. If -- what?

A. If the York Township Council had put in a test machine.

Q. At approximately \$5,000?

A. Yes.

Q. Was the city of Toronto ever asked?

A. No.

Q. And York Township would not put up the money?

A. Reeve Hall did his best to get the money, but

he could not get it.

Q. There is a fairly complete report by Mr. Belyea on the equipment, but I suppose you would say it was not accurate in that there was not sufficient tests carried out? Yet, on the other hand, you said a test was carried out as to smoke, and apparently Mr. Belyea has now based his report on that which was erroneous?

A. It was just oil and a pipe. Had I known he was going to make a test, I would have put the machine on seven different chimneys, so he could have seen first this black smoke, and then have seen it getting lighter and lighter until he got to the sixth one.

Q. He never saw this whole \$5,000. machine?

A. It cost more. That machine for Runnymede has to be made up from metal and stuff I have at the shop now. The machine has been made up for thirteen years, and either added to or taken from; is that not it?

Q. We are trying to help you, and we want you to help us, but we do not seem to be getting anywhere. Have you any suggestion as to putting up one of these machines, so we could see it tested? Have you one set up anywhere?

A. I can get it ready in a week's time, and let

you see it.

Q. And I suppose if the machine was satisfactory, you would go ahead and sell the machine to the people?

A. That is right.

Q. So is it not in your interest to show us a sample of how it works?

A. Yes.

Q. Without involving us as to how it works?

A. Yes.

Q. Would you be prepared to set up a machine now at a location where we could see it in operation?

A. How many would want to come down?

Q. It might be only one person. When would you have it so we could see it?

A. Wednesday week.

MR. MACAULAY: Do you not think, in view of the conflict in the position taken by Mr. Baxter and Mr. Belyea, that somebody should go and see it tested, and take Mr. Belyea with him? /

THE CHAIRMAN: There is one thing to consider there. We have been talking about railroads, and there is no law at all which controls railroads.

MR. MACAULAY: Yes, but we would be able to submit to the Board of Transport Commissioners the fact that there is a machine available.

THE CHAIRMAN: That is right, but if we are going to see the test, we should have it done over some of the industries, over which the by-law has control.

THE WITNESS: True.

BY THE CHAIRMAN:

Q. Is there any organization which would submit to this test in Toronto?

A. If the machine would go into the plant?

Q. Yes.

A. If it goes, it has to stay there.

Q. For the benefit of the Committee, so the machine could be seen and tested?

A. There would have to be one put in where it was going to stay, because it involves a lot of time and money.

BY MR. MACAULAY:

Q. What about the railway?

A. The railroad was prepared to put that in at a cost of from \$75,000. to \$100,000, if the York Township Council would put up \$5,000. as a test case.

BY MR. MORNINGSTAR:

Q. Maybe we could test it in an incinerator.

A. They are taking out enough poisons, yes.

BY MR. BRANDON, Q.C.:

Q. The Canadian Pacific was prepared to spend

\$75,000. for testing your equipment?

A. No, they were prepared to spend the money to build a stack, and put the machines around these thirty-two stacks -- right around the roundhouse, in the roof.

BY MR. MACAULAY:

Q. Provided the test proved to be successful?

A. Yes.

BY MR. BRANDON, Q.C.:

Q. Where was the Canadian Pacific test to be made?

A. They were giving me one of their big locomotives, and they put a train at my disposal, and two or three men.

Q. This was at the Runnymede roundhouse?

A. Yes.

Q. Was that test made?

A. No. York Township would not put up the money.

Q. What was the York Township Council supposed to do with the \$5,000?

A. To pay for the machine.

Q. Was the \$5,000. to be put up by the Township, to cover the cost of temporary installation?

A. Yes.

Q. And the Canadian Pacific was putting a train

at your disposal, and a locomotive?

A. Yes.

Q. And you were to put in the equipment?

A. Yes.

Q. But it never came about?

A. No.

Q. The only thing lacking was the \$5,000?

A. That was lacking, yes.

Q. That was the stumbling block?

A. Yes.

Q. When was this supposed to have occurred?

A. Last summer.

Q. The summer of 1955?

A. 1954. But the order still stands with the Canadian Pacific, to put the machines in.

Q. One reason I am interested in this particular phase, is that York Township has been interested -- I know that Council and a great many ratepayers are interested in having this smoke in roundhouses eliminated, and I wonder why they could not see their way clear to raise \$5,000. for a test. Can you enlighten us on that?

A. No. I went to a committee meeting, and they said there was "nothing doing".

Reeve Hall was there and Mrs. Gill was there,

and they fought hard, but they could not get the money.

BY THE CHAIRMAN:

Q. Mr. Baxter, now that the Metropolitan Council has taken over the smoke situation, have you discussed it with the Metropolitan Chairman to see if they would put up this \$5,000?

A. Have they anything to do with it?

Q. They have now.

A. I would rather see the test -- I have been on it for thirteen years, and it has cost me a great deal of money.

Q. But you have not made a nickel out of it?

A. No, not a nickel. I have a machine now for poisonous gases from the houses, and that will stay where it belongs, until I get the other.

BY MR. MACAULAY:

Q. Let us finish churning this one about the railways. You say the railway was ready to go on with the test, and you have the machine?

A. Yes.

Q. The only stumbling block is the \$5,000?

A. Yes.

Q. The Chairman asked you if you had made any overtures to the Metropolitan Council, asking them to put up this \$5,000. Have you?

A. No.

BY THE CHAIRMAN:

Q. Perhaps you did not know that the Metropolitan Council has now taken over the responsibility for smoke abatement in Metropolitan Toronto, and, consequently, the York Township Council has nothing to do with it. Any monies to be spent must come from the Metropolitan Council.

We are interested in it, if it is successful, and we want to help out all we can, and we think it might be wise for you to consult with Mr. Gardiner, and learn their position in regard to it.

A. It would be good if you would just drop a little note. That would help out. I would be going up there an utter stranger to Mr. Gardiner.

MR. MACAULAY: Who, on the Metropolitan Council, has the basic responsibility for a thing like this?

THE CHAIRMAN: The Chairman.

MR. MACAULAY: It might be a good thing for you, as Chairman of this Committee, to send a letter over your signature.

THE CHAIRMAN: I cannot see anything wrong with that.

MR. MACAULAY: Mr. Baxter is just an ordinary

citizen, going up there, while we are sitting on this problem, and he feels we should perhaps make an opening for him.

THE WITNESS: They know you, but they do not know me.

MR. MACAULAY: Why not send a communication telling him what the problem is, and asking him for an opportunity of discussing the matter with him.

THE WITNESS: I would rather see the Chairman do that, and put it where everybody could see it.

MR. MACAULAY: And then everybody would see that we are doing our job.

THE WITNESS: It is a finished job. You just turn the valve, and that is all there is to it.

BY THE CHAIRMAN:

Q. If the Canadian Pacific said they would spend \$75,000, I would think they are very co-operative.

A. I went down to see Mr. Barefoot, of the Canadian Pacific Railway, and Mr. McGregor of the Canadian National Railway. I have been experimenting with this machine for thirteen years.

MR. MACAULAY: Maybe we can cut down on the next thirteen years.

BY THE CHAIRMAN:

Q. You are a very persistent man. Suppose we

do that, then the next move is up to you. We will send this letter on to Mr. Gardiner, and you contact him, and then we would be glad to have you come back before this Committee at a later date.

A. If anything can be done, you people can do it.

Q. That is what we are here for.

Are there any further questions to ask of Mr. Baxter?

BY MR. BRANDON, Q.C.:

Q. I understand, in addition to this railroad-smoke problem, is it the same machine or another machine which takes the fumes out of oil burners for domestic use?

A. It is a different style.

Q. Do all of these machines go back in their patent stage for twelve or thirteen years?

A. No, just two years.

Q. Have you any other type of similar equipment aside from the elimination of fumes from oil burners domestically? Have ^{you} a commercial machine, for example?

A. We have a machine set up for Diesels.

Q. Such as buses?

A. No, Diesel engines on the railways.

Q. Do you have anything by way of attachments for the elimination of fumes from Diesel engines in buses

and tractor trailers?

A. I lack the money.

Q. So you just have the two types of equipment?

A. Three types. Foundries.

BY MR. MACAULAY:

Q. By "foundries", what do you mean?

A. That grey smoke.

Q. You mean any industry, or real foundries?

A. Foundries, yes.

Q. And steel works?

A. No.

Q. What do you mean by "foundries"?

A. Like what is down on Cherry Street, and there is one on Eastern Avenue.

Q. What company is that?

A. On Cherry Street?

Q. Yes.

A. I do not know. You can see it, as you turn into Cherry Street.

Q. You would not include all foundries, such a company as Hinde & Dauch?

A. The paper mill?

Q. Yes.

A. No. There is a paper mill in Cornwall, and we are trying to contact them, to take the fumes away.

Q. Would your equipment go into anything other than foundries?

THE CHAIRMAN: It would go anywhere.

MR. MACAULAY: Apparently it would not.

BY THE CHAIRMAN:

Q. Do you mean as a "foundry", a company which makes shoes, for instance? Could you include that?

A. No.

Q. Just a foundry?

A. Yes.

MR. MACAULAY: To summarize, Mr. Chairman, he has one for railways, and one for oil-burning equipment, including Diesels on the railways, and a third one fitted only for foundries, not such industries as paper mills, and so forth.

BY THE CHAIRMAN:

Q. Have you another for paper mills or shoe factories, or soap works?

A. No. If we were invited, we could make a machine to do that.

MR. MURDOCH: It would be quite evident that the basic principle is the same, but perhaps different items in the equipment would have to be used for different types of gases.

BY THE CHAIRMAN:

Q. You have done work on this for thirteen years,

and have not sold a machine?

A. That is right. We only got the machine perfected two and a half years ago.

Q. Well, you are a martyr for this smoke control and air pollution. Or are you doing it as a public-spirited citizen?

A. No. I want to make money like anybody else. My own business keeps me going, but I cannot spend any more money for the company.

BY MR. THOMAS (Oshawa):

Q. How many men do you employ now?

A. Four.

BY MR. MACAULAY:

Q. What is the function of this machine?

A. To cut down fly ash -- it will cut it down about 20 percent.

Q. You are doing that now?

A. Yes.

BY MR. THOMAS (Oshawa):

Q. Would there be any complaint that the installation of your mechanism would interfere with the draft, in any way?

A. No.

BY MR. MACAULAY:

Q. How much would a machine cost to put into a

house?

A. You are out to save some money.

Q. We are not out to save anything.

A. How big a house have you got?

Q. I did not mean my own house. I just burn kindling, but say an average eight-roomed house, with an oil burner?

A. About 15 percent. or 20 percent.

Q. No, how much would a machine cost the purchaser of it?

A. Twelve dollars.

Q. Only twelve dollars?

A. At the most.

Q. Twelve dollars per machine?

A. Yes.

Q. And would save their average consumption of fuel by 20 percent. or 25 percent?

A. Yes.

Q. And also cut out the exhausts which now get into the air?

A. No, they will not cut out the poisonous gases.

Q. It is just to save pollution?

A. Yes. We have a machine to do that, but it is not on the market.

Q. How much would that machine cost if people

were to buy it?

A. I have not the costs as yet.

Q. Give me an estimate.

A. From \$20.00 to \$25.00.

Q. To cut out air pollution in the average house?

A. Yes.

Q. With oil burners?

A. Yes. The one to which I refer has to do with smoke.

BY MR. BRANDON, Q.C.:

Q. Mr. Baxter, if I may ask one further question; these units with which you are dealing, deal with the matter of elimination of smoke from locomotives. Could that be used in any way to eliminate smoke from a brick plant, or a tile plant?

I know they are exempt, but they cause a great deal of nuisance to a great many people. Could this idea of yours be used to eliminate smoke of that kind?

A. To a smaller extent. We went up to the office of the brick company, and they just laughed at us.

Q. What I am interested in knowing is, will your mechanism eliminate the smoke?

A. Yes.

Q. And you could manufacture a unit which would

eliminate smoke from such plants?

A. That is right.

BY MR. MACAULAY:

Q. Can you give Mr. Brandon an estimate of the cost of one of these machines?

A. Oh, I cannot do that. I would hate to charge too much, and, on the other hand, I would not like to rob myself.

THE CHAIRMAN: Are there any further questions, gentlemen? (No response).

If not, we thank you, Mr. Baxter, for coming along and seeing us today.

THE WITNESS: Thank Doctor Evis. He told me all about it. He can test all of the different grades of smoke he wants to.

BY THE CHAIRMAN:

Q. The next move is with the Chairman of the Metropolitan Council, and we will go on from there.

A. Yes.

THE CHAIRMAN: Thank you very much, for coming down.

---The deponent retired.

THE CHAIRMAN: We have another report here --

MR. BRANDON, Q.C.: Before we leave this point,

and I being a new member of the Committee, what is the name of the company Mr. Baxter represents and the nature of his business?

MR. MACAULAY: I tried to get it. It is the Field Manufacturing Company of Canada, Limited. He describes himself as a "manufacturer of 'field' barometric control", and he has a patent, dating from 1930.

He operates from 286 Main Street.

MR. BRANDON, Q.C.: Did he say he was originally a locomotive engineer?

MR. MACAULAY: He calls himself in his letter to the Chairman, "J. M. Baxter, Engineer". Today, in evidence, he said he was not a university engineer.

Mr. Belyea goes further and says he is not an engineer -- period,-- as I recollect it.

MR. GORDON: Did he not say he was a locomotive engineer?

MR. MACAULAY: He said he called himself a "railroad engineer".

MR. MORNINGSTAR: That is the same thing.

MR. MACAULAY: Maybe he specializes in railroad engineering.

THE CHAIRMAN: We have another interesting report here on another phase of the problem, and I will

ask the Secretary to read it.

DOCTOR EVIS (Secretary): This (indicating) is from Dr. A. H. Sellers, Medical Statistician, of the Department of Health. I have just received this at noon to-day, and I have no idea of what it contains. I asked him to try and get some statistics, comparing the cancer mortality in urban areas of Ontario with that in rural areas.

He said:

- "1. Further to your memorandum of April 20, 1955, attached are two copies of some material relating to your queries on behalf of the Special Committee on Air Pollution and Smoke Control prepared by Dr. MacKay and Miss Sloman, in this Division.
2. Please note that the statistical data provided relate to males only; a similar table on females is being prepared and will be sent along shortly. There are of course many possible reasons for any observed differences.
3. May I point out that the statistics used are all derived from official vital statistics reports and any analysis is necessarily limited by the extent of such data and the small numbers of deaths for individual municipalities for particular

causes.

4. Possibly you may wish to arrange to have copies of the enclosures reproduced for the members of the Committee so that they may have a chance to examine them at their leisure."

Then, attached to that, is a statement headed "Air Pollution and Smoke Control", and the sub-heading is "Analysis of Mortality in Ontario due to Cancer of the Respiratory System and Other Respiratory Diseases", and he said:

" Because tabulations of deaths for residents of individual cities in Ontario are available only by the Intermediate List of 150 Causes of the International Statistical Classification, the attached table (Table I) shows deaths from cancer of the trachea and bronchus and lung not specified as secondary, rather than from all malignancies of the respiratory system. Data are presented for five large cities, two groups of smaller urban municipalities and the residual comprising "rural" areas and municipalities under 15,000. Again, numbers are so small that we have shown the actual deaths and the deaths to be expected at the age-specific rates by sex for all Ontario from the particular cause. Age-

adjusted rates for the various cities and groups of municipalities cannot be computed at present because the required data on mortality by age, sex, and cause are not published. A list of the cities in each urban group is appended: the data relate to cities as specified, not to metropolitan areas, as the numbers of deaths according to the latter areas are not yet available from published vital statistics reports.

In Table I and II an asterisk denotes that the actual number of deaths differs from the expected number by an amount greater than is likely to be due to chance alone."

Then there is a foot-note which reads:
"The difference between the actual and expected numbers of deaths was considered statistically significant if it exceeded 2.5 times the standard error of the difference."

Then it goes on and says:

"Thus the male deaths from malignant neoplasms of the trachea, bronchus and lung are unexpectedly high in Toronto and Windsor, from cancer of all forms in Hamilton, Ottawa, Toronto

and Windsor, from pneumonia and bronchitis in Toronto, and from respiratory tuberculosis in Ottawa, while deaths from cancer of the trachea, lung and bronchus, from cancer of all forms, and from pneumonia and bronchitis are unexpectedly low in the rural areas and the municipalities of under 15,000. The reasons for these differences cannot be stated from the evidence now available."

MR. MACAULAY: Have you read this before?

DOCTOR EVIS (Secretary): No, I am reading it for the first time.

MR. MACAULAY: Why not paraphrase it as you go through it, and explain it?

DOCTOR EVIS (Secretary): I would like to get Doctor Sellers here to explain it.

MR. MACAULAY: Could a copy be available to us, so we could read it tonight?

DOCTOR EVIS (Secretary): I gather that malignancy of the trachea and the windpipe into the lungs, and the lung itself, are higher than you would normally expect in Toronto, Windsor, Hamilton and Ottawa.

But in regard to "cancer of all forms" -- I am not sure just what he means by that. We would have to ask him.

This goes on:

"2. Mortality Statistics, Other Countries

Comparable mortality figures for other countries are difficult to find, since most countries having accurate mortality records are either rather highly urbanized or small. For Canada, the age-adjusted mortality rates* from cancer of the respiratory system in 1953 (expressed per 100,000 population with the same age distribution as the population of Canada at the 1951 census) and the proportion of the population of each province recorded as 'urban' in the 1951 census were as follows:

Province	Age-adjusted Mortality Rates from Respiratory Cancer		Proportion of Population 'Urban' at 1951 Census
	Males	Females	
Ontario	22.2	3.5	70.7%
British Columbia	22.2	4.0	68.1%
Manitoba	21.7	2.9	56.6%
Quebec	20.5	3.4	66.5%
Alberta	19.8	5.6	47.9%
Saskatchewan	17.9	4.0	30.4%
Nova Scotia	17.5	3.6	53.7%
Prince Edward Is.	12.5	1.2	25.1%
New Brunswick	12.0	5.5	41.7%

There is seen to be some correlation between the respiratory cancer mortality for males and the proportion of the population residing in 'urban' areas; this correlation is not shown for females."

MR. MACAULAY: Cancer is higher in those places than in the rural areas? Is that right?

DOCTOR EVIS (Secretary): Yes, and the respiratory cancer seems to be abnormally higher in Toronto and Windsor, than in the rural areas.

MR. MACAULAY: Windsor and Toronto are higher with the trachea and bronchial tubes is also higher?

DOCTOR EVIS (Secretary): This goes on:

"3. Air Pollution vs Morbidity and Mortality

No evidence indicating the relationship between air pollution and mortality or morbidity in Ontario is at present available in this Division."

MR. ELLIOTT: He did not know the reason?

DOCTOR EVIS (Secretary): And the deaths from cancer of the respiratory system, and other cancer of all forms, and bronchitis are unexpectedly low in the rural municipalities, with less than 15,000 people.

MR. MACAULAY: He uses the term "unexpectedly low", as the usual medical safeguard?

DOCTOR EVIS (Secretary): I believe he calculates statistically -- I think I had better not speak to that. He can do it himself. I would hate to put my interpretation on his words.

THE CHAIRMAN: Going back to the table you just read, which is the highest?

DOCTOR EVIS (Secretary): Ontario has the highest urban population. 70.7% of the population lives in urban areas.

The smallest seems to be Prince Edward Island, with only 25.1%.

MR. MACAULAY: Does he give the comparative rates?

DOCTOR EVIS (Secretary): For males in Ontario, the rate for respiratory cancer is 22.2 per 100,000 population.

MR. MACAULAY: Where do we stand, without reading a lot of figures?

DOCTOR EVIS (Secretary): Ontario is the highest, British Columbia is next, then Manitoba, Quebec, Alberta, Saskatchewan, Nova Scotia, and then Prince Edward Island is the lowest.

THE CHAIRMAN: Ontario is more than double that of Prince Edward Island?

DOCTOR EVIS (Secretary): Yes.

MR. MACAULAY: He is pointing out that with the more urbanized areas, they have the highest cancer incidence.

DOCTOR EVIS (Secretary): Yes.

MR. MACAULAY: Assuming that he will prove that --

DOCTOR EVIS (Secretary): He is not trying to prove anything.

MR. MACAULAY: He is simply pointing it out?

DOCTOR EVIS (Secretary): Yes.

MR. MACAULAY: You are a doctor; is there any reason why the respiratory deaths from cancer should be higher amongst men than women?

DOCTOR EVIS (Secretary): I would hate to say, because many specialists are debating that point right now.

THE CHAIRMAN: There is nothing proven as yet?

DOCTOR EVIS (Secretary): No.

MR. MACAULAY: It may be anatomical.

DOCTOR EVIS (Secretary): It could be.

MR. MACAULAY: Or even the construction of the body.

THE CHAIRMAN: Let us not get opinions from the Secretary. Let us get them from the report.

MR. MACAULAY: We are trying to understand what he is saying.

DOCTOR EVIS (Secretary): The third item deals with "Air Pollution vs Morbidity and Mortality". I have already read that.

MR. MACAULAY: By "morbidity" he means --

DOCTOR EVIS (Secretary): Illnesses. In other

words, he does not know why the rates are higher; he just has the figures.

MR. MURDOCH: Mr. Chairman, I think we are going into a field mentioned in that letter which is beyond what we are trying to do.

As I mentioned at one of our previous meetings, the International Joint Commission is making a study at the present time -- and a very detailed study -- trying to find out if it is less healthy to be living in an atmosphere where there is smoke and air pollution, rather than in the country, where there is no such pollution.

As a matter of fact, this experiment runs for two years, and a short time ago they published their findings at the eighteen-months' stage, and if I could possibly just quote from it here, it says:

" The health survey is part of a large study on air pollution by the International Joint Commission, which has been going on since 1949. Complaints from both sides of the border that ships on the Detroit River were causing a smoke nuisance promoted the probe.

The main study seeks to determine what pollutants are in the atmosphere, where they come from, how dense they are and how they are affected

by weather study now nearing completion is to determine the effect of air pollution on the health and well-being of the people of the community.

The ultimate objective of the whole study is to find out how to control air pollution, how much it would cost, and who should pay.

For the past two years groups of trained enumerators have been visiting and questioning families at intervals of two weeks. Special attention was paid to those who suffered from hay fever and asthma.

A fairly accurate record of the health of these families has been gained and compared to frequency and serious illnesses in families in unpolluted areas.

Other information on the general health of the community have been analyzed as well.

'We hope the results of the whole investigation will provide us with valuable information that will be valuable to health workers everywhere', Mr. Martin said.

'With this information it may then be possible to improve the environment in which we live'."

They have groups of people which these trained people can visit periodically. They are in Windsor, Kingsville and Harrow, so they have different types with which to deal.

With regard to health, there is nothing we could do to equal what is being done by this International Joint Commission.

MR. ELLIOTT: It is a survey along the border?

MR. MURDOCH: Yes.

MR. MACAULAY: Your point is that we should not set out to prove something they are trying to prove? I do not think that is what Doctor Evis (Secretary) is after.

If there is a set of conclusions arrived at in this report, it must be based on a certain amount of general evidence, and this is a general preamble and introduction to the subject.

Anybody is free to come to any conclusion they want. We are not trying to find out what causes cancer. We are just pointing out that the higher the urbanization, the greater the incidence of cancer.

MR. ELLIOTT: Does he have any figures there from the big cities in the United States?

DOCTOR EVIS (Secretary): He has figures from "other countries". He says, "mortality statistics,

other countries".

This report goes on to state:

"4. Studies in Other Countries

Studies made elsewhere have shown that mortality from lung cancer in England and Wales, and Denmark, is higher in urban areas than in rural; in England, it appears to be related to the density of buildings rather than that of population; in England atmospheric pollution is decreasing, while lung cancer is rising; in Denmark the increase in lung cancer is greatest among the younger age groups, and does not appear to be higher in leeward than windward areas."

That is the end of that. Then there are two tables, Table I and Table III, which show the actual and expected male deaths from certain causes by place of residence, and it shows Ontario 1950-1952.

Table III, "Municipalities in the Population Groups". These two Tables are as follows:

(page 233 follows)

TABLE I
ACTUAL AND EXPECTED MALE DEATHS FROM CERTAIN CAUSES, BY PLACE OF RESIDENCE
ONTARIO, 1950-1952

SIZE OF PLACE OF RESIDENCE 1951 CENSUS	Average Annual Number of Deaths from									
	Malignant neoplasm of trachea, bronchus and lung (162,163)		Cancer, all forms (140-205)		Pneumonia and bronchitis (490-502)		Respiratory tuberculosis (001-008)			
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected		
Over 90,000	29	21	178	144*	45	35	14	15		
Hamilton	11	10	82	71	19	18	12	7		
London	23	18	166	126*	39	34	20	13*		
Ottawa	123	78*	662	537*	169	120*	56	52		
Toronto	20	12*	98	78*	12	19	9	8		
Windsor	206	139*	1,186	956*	284	226*	111	95		
TOTAL	42	37	282	268	76	66	24	23		
30,000 89,999	30	27	211	191	41	49	21	19		
15,000 29,999	185	260*	1,642	1,906*	456	516*	162	181		
Under 15,000 and rural	463	463	3,321	3,321	857	857	318	318		
All Ontario										

* The difference between the actual and expected number of deaths is statistically significant.

Doctor Sellers has just sent over Table II, presenting the statistical data for females, in the same form as Table I, for males.

The urbanization factor appears not to affect females very much for the cancer shown.

Table II is as follows:

TABLE II
ACTUAL AND EXPECTED FEMALE DEATHS FROM CERTAIN CAUSES, BY PLACE OF RESIDENCE
ONTARIO, 1950-1952

SIZE OF PLACE OF RESIDENCE 1951 CENSUS	Average Annual Number of Deaths from							
	Malignant neoplasm of trachea, bronchus, and lung (162,163)		Cancer, all forms (140-205)		Pneumonia and bronchitis (490-502)		Respiratory tuberculosis (001-008)	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
Over 90,000								
Hamilton	5	4	172	146	32	29	5	8
London	2	2	77	82	20	18	4	4
Ottawa	4	4	172	146	25	30	10	8
Toronto	20	15	623	583	124	110	28	27
Windsor	2	2	69	72	13	15	4	4
TOTAL	33	27	1,113	1,029*	214	202	51	51
30,000-89,999	7	6	244	251	56	54	11	12
15,000-29,999	6	5	223	205	36	44	10	11
Under 15,000 and rural	35	43	1,556	1,651	378	384	89	87
All Ontario	81	81	3,136	3,136	684	684	161	161

* The difference between the actual and expected number of deaths is statistically significant

[illegible]

In other words, it seems to affect males. It may be that the males go down to work in the factory area, while the females stay at home in Willowdale or some place like that.

THE CHAIRMAN: I understand that our terms of reference are that we are to enquire into all phases of air pollution and smoke control, and how it affects the people of Ontario. I do not think you have to be very smart to realize that the air on Manitoulin Island is better than in downtown Toronto. We do not need any investigation to determine that. It is a fact, that one is clean and pure, with maybe a little hay fever, while the other is rancid, and unhealthy.

MR. MACAULAY: This is what we would call, I submit, in law, a "negative test". It does not say you can connect up pollution with illness, but it does not say it is not there. It does not prove that it does not. It says you cannot connect the two, but it does not deny it is connected.

THE CHAIRMAN: Air-pollution investigation is very much in the preliminary stages, and nobody can come out and say that air pollution causes cancer of the lung, or any other part of the body.

DOCTOR EVIS (Secretary): At the meeting of the Air Pollution Commission in Detroit, they had experts

from all over the continent, and some from England, and the study was quite openly criticized by several experts on the basis that their so-called "control areas" were actually just polluted test areas. That is why they did not appear to be getting much difference in the amount of illnesses.

MR. MACAULAY: If they took Manitoulin Island, where they presume everything is fine, and then took Detroit, to show the difference --

DOCTOR EVIS (Secretary): They have taken different areas in Detroit. Some are significant, and somebody said when the study was made the wind was in a certain direction and the one area which was supposed to be polluted, actually was not, when the wind changed.

MR. THOMAS (Oshawa): I suppose we have all heard it said that in a post mortem a doctor can tell by examination of the lungs, whether a person was a resident of an urban or a rural area.

DOCTOR EVIS (Secretary): I am not a pathologist, and I cannot give you an opinion on that. Doctor Sellers probably could.

MR. MURDOCH: With regard to this study, I suppose I must be fair and mention everything about it. They were in my own area, in the city, and also in a country town. These people went around and interviewed

all these families, and had these things brought to their attention, and they were paid quite a bit for this work.

They had just started to work prior to the Federal election, and there seemed to be some kind of a tie-up at the time.

They had one of these machines right on my farm, and I was able to talk to the two men who came down to look at them, and I gained some information in that way. They made their investigation amongst different types of groups, and different kinds of air pollution. In Harrow, for instance, there was no pollution at all and the air was clear. However, on the Detroit River, it was a sort of blackish yellow in colour, which denoted different types of impurities in the air.

That brings us to the fact that there are other factors to be considered. Chemically, the air in Harrow is as pure as in the Georgian Bay, but we have humidity there, and we appreciate leaving there and going to Georgian Bay, the same as the people in Toronto.

DOCTOR EVIS (Secretary): There is one other item. It is data presented by Doctor Sellers on mortality statistics, that is, the number of people per

100,000, who died from cancer, and shows how many people got bronchitis, and were ill from pneumonia.

MR. MURDOCH: There are a lot of people who move in from the country to the city, for the purpose of dying. They get so old, they want to move into the cities with all its comforts. They get tired of the sheltered life of Harrow, and when they can afford it, they move to the cities and enjoy all the comforts of the cities, and die there.

DOCTOR EVIS (Secretary): The figures are corrected for that sort of thing. They are corrected for age group, and sex, and something else. They are corrected and balanced for that, as regards the percentage of old people, and so forth.

THE CHAIRMAN: If we could just leave this for the moment, I see our public-relations people are here today, in the persons of a couple of fine, outstanding young men, and perhaps we could hear what they have to say, before we continue with this discussion.

D U N C A N H E R I O T

and

D O N A L D G O R D O N

appeared before the Committee, but not being sworn, deposed and said:

THE CHAIRMAN: Gentlemen, the Committee brought up the idea of public relations, and how they would fit into this picture, and rather than act on it later, it was suggested you come personally and speak on behalf of your firm, and tell us what you care to say to us.

MR. HERIOT: At this point, may I say that this is sort of abrupt and not having had a reply in the first place, I am perhaps not as prepared to speak to you as I might be.

I would certainly like to have a little more information as to the nature and extent of your enquiries.

Public relations is a curious thing. It has many phases. For instance, if you were going into a small locality in the city, to deal with various elements in that locality, such as industries and households, surveys can be made which have many purposes.

First, they can be used to obtain information. Next, they can be used to obtain sympathy; they can be used to obtain understanding, and, finally, they can be used to clarify a few misunderstandings.

If you required an industry to do certain things to improve its exhausts, for instance, the benefits which are derived will land in the community's lap, and these improvements can be publicized so the

community's interest can be drawn to that industry.

THE CHAIRMAN: To be specific; say the Committee is planning a trip to London, Sarnia and Windsor, to inspect and discuss with air pollution people in those areas means whereby we can assist them by way of legislation and education. What could you do for us?

MR. HERIOT: To spread the information into the right channels, by radio, and so on. And, for instance, in trade publications which would have any interest in the subject whatsoever, and to see that they secured all the information available, and also to see your press and radio people, and so forth, and to make sure that any such information was disseminated in any designated area.

That is a straight publicity job.

THE CHAIRMAN: At the time you were here before, there was some figure set, I think it was \$500., as a quarterly-fee basis. Would that be the gross charge? Would there be any extras in addition to that approximate figure?

MR. HERIOT: Any expenses which are involved would be in addition, of course.

MR. MACAULAY: I missed the point of what you meant by the "\$500.00 quarterly". Do you mean \$500.00

for each quarter, or \$500.00 by quarterly instalments?

MR. HERIOT: For each quarter.

MR. ELLIOTT: Do you make the contacts and set up a tour?

MR. HERIOT: Not necessarily. We could certainly co-operate with Doctor Evis, or whoever is involved, if they were doing that sort of work.

MR. MACAULAY: Is this a fee, regardless of the amount of work you do?

MR. HERIOT: In this business, you are constantly faced with the necessity of deciding for your client whether he should have a chicken house or a mansion.

This "\$500.00" figure is an inspired guess as to how much time you would require. With more specific information regarding the requirements, we could give you a nickel-and-dime proposition. It is as accurate as that.

THE CHAIRMAN: There were other questions some of the members wanted to ask about the work you would do on behalf of the Committee. I understand Mr. Brandon had some questions.

MR. MACAULAY: It was Mr. Elliott. He had in mind that we understand now that if we were having hearings, say, in Windsor, it would be your responsibility

to see that the public knew we were coming, that is, that the fact that we were coming was made public, and the fact that the representations which were made before us were made public. That is under the strict heading of "publicity".

Mr. Elliott wondered if Doctor Evis directed to you simply the nature of our meetings, and that we were going to Hamilton, for instance, and would you then line up the people, and make the appointments with people whom you felt were within the ambit of our studies and whom we should interview? Is that part of your job?

MR. HERIOT: That has not been decided in advance. You might consider that as interference.

MR. MACAULAY: Supposing we were going to some location, and want to make a tour around the harbour, for instance, and want to see the iron works and the steel works, and we would like to interview the Council and the smoke abatement advisory committee in, say, Hamilton; would you line that up for us?

MR. HERIOT: I think that would be outside of our scope.

MR. MACAULAY: Then what can you do for us, other than make sure we get into the press?

MR. HERIOT: How can anybody be sure of that?

All we can be sure of is that the proper people --

MR. MACAULAY: I am not trying to be facetious.

I am trying to enquire into the nature of the services you can perform for the Committee, but other than the fact that we were coming and what happened when we were there, would be publicized, would there be any other services you would perform for us?

MR. HERIOT: In this matter of research; there are many forms of research, and if the scope of your investigation goes beyond visiting and holding hearings, if you actually authorize local investigations, we could be of considerable service.

MR. MACAULAY: I do not think we will do that. I am, of course, speaking without any authority, but I do not think we would run tests such as "If you were voting, for whom would you vote, for Stevenson or Eisenhower". Our job is to find out what is what. We would not go into Hamilton and ask who has to do their washings over again.

MR. HERIOT: This is rather a more personal thing. You can easily ask a manufacturer what he had done about his exhausts, and how much it had cost him, and where it fitted into his economic picture, and how it could be improved, and what the cost of the improvements would be, and whether it would be necessary to

amortize these costs.

Of course, I am just guessing at this.

MR. MACAULAY: They have one in Hamilton at the moment which they estimate will cost \$130,000.

MR. ELLIOTT: Of course, we are almost 250,000 people.

THE CHAIRMAN: You are speaking about population. Mr. Macaulay is speaking about the costs.

MR. ELLIOTT: We are trying to show a co-operative spirit. We are trying to help them in their smoke problem, or chemical problem. In a public way, it is done by paid advertising. I think you will find all the reporters, the radio, and the TV are quite anxious to get the news before the public about this Committee. I cannot say that we need this at all. Of course, I am only one of the Committee.

MR. HERIOT: Have you anything outlining the scope of your reference?

MR. MACAULAY: I would suggest that we might postpone this discussion, and provide Mr. Heriot with a copy of our terms of reference, which he would want to consider, and we could perhaps have something concrete for our next sitting in Toronto, and they might send us a memorandum of what they can do. Then we can discuss it and vote on it.

THE CHAIRMAN: Actually, that is not the case.

In reading over this letter they sent us, I think they outline in very definite terms what they can do for the Committee. They say:

" We feel that we can be of use to you. Our experience on Air Pollution and Smoke Control subjects has been as follows:

- a) Studies and public relations work in connection with smelter fumes from a large mining company in the West;
- b) Somewhat similar work connected with the large, publicly-owned Polymer Corporation at Sarnia in its earlier stages;
- c) Some special familiarity with research on exhaust problems from motor traffic in highly congested traffic areas;
- d) A detailed study and report on Mine Ventilation and silicosis prevention for the Ontario Mining Association (copy attached)."

That is very definite as to what they have done.

MR. MACAULAY: Or what can they do. It is their experience and their pedigree.

MR. HERIOT: I like your suggestion of becoming a little more familiar with the details of

the Committee's work. I think we can offer you a good deal, more intelligently, after that, than I can at the moment.

MR. MACAULAY: I think that is fair.

THE CHAIRMAN: The reason for having you here is this: your letter was reviewed again, and members of the Committee wanted to see you and get some firsthand information, which we have done.

If we follow that up with a little more information -- after all, we will be operating for many months yet -- perhaps you can be more specific, and we can then take another look at it.

MR. HERIOT: I will appreciate that very much. This has been extremely abrupt. I have been very busy and I am afraid the information I have on this matter at the moment is very, very slim. If I could sharpen up my wits, I think I could be of more use to you. I would like very much to do that.

This looks like a very interesting subject, and we would like to do the work, and do such work as would be of some benefit to the community as a whole.

THE CHAIRMAN: Thank you for coming here. Incidentally, gentlemen, associated with Mr. Heriot is Mr. Donald Gordon -- not the Head of the Canadian National Railway, but one of the outstanding musicians

on the radio here in Toronto.

---Messrs. Heriot and Gordon retired.

THE CHAIRMAN: Is there anything else we have on the agenda for today?

DOCTOR EVIS (Secretary): The other people did not appear, so I think that is about all.

THE CHAIRMAN: Is there anything anybody else would like to say? (No response). If not, we will adjourn this meeting until tomorrow morning.

DOCTOR EVIS (Secretary): Shall I ask Doctor Sellers to be here tomorrow morning, or shall we wait until you have read the report, and then question him on it?

MR. MACAULAY: I think that is the kind of evidence Mr. Elliott suggested this morning, that it might be well for us to consider nearer the end of our hearings on this matter. The significance of this sort of escapes me at the moment. I think I will recognize the relative importance of other things, when we have completed some of our visits. All I have so far is my own file, which I have been collecting for several months.

THE CHAIRMAN: We have the report, and we can call him at any time. He is with the Department.

MR. ELLIOTT: Coming back to what Mr. Macaulay has just mentioned: we have the information there have been deaths due to smoke in Los Angeles and London, England. I think it would be very valuable to visit those places and find out what caused the smoke, and what they are doing to eliminate it. Then we can come back to our own people and give them a better picture of what they may expect, and what they can do to eliminate the smoke, and control the air pollution.

MR. MACAULAY: There was this very good article in "Fortune" magazine, on Los Angeles. If you are going to take the Committee to Los Angeles, this article should be in the report. It is contained in five or six pages, and will give us a good summary, and some idea of what is going on out there.

THE CHAIRMAN: If there is nothing further, we will adjourn until tomorrow morning at ten o'clock, to reconvene in Committee Room No. 1.

We are having other people coming before us tomorrow, and at two o'clock we have arranged with a Toronto Smoke Abatement Officer to take us on a tour of the city to some of the other areas, in addition to those we saw before.

The meeting is adjourned.

---Whereupon at 3:33 of the clock p.m., the further proceedings of this Committee adjourned until Wednesday, September 21st, 1955, at 10:00 o'clock, a.m. to reconvene in Committee Room No. 1, Parliament Bldgs.

APPENDIX "A"

Article entitled "GARBAGE IN THE SKY,"

page 142 et seq, April issue FORTUNE Magazine.

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Every year the U.S. is clouding up its sky with an estimated 50 million tons of aerial garbage. No other country in the world creates so much power, drives so many cars, burns so much refuse. From activities such as these comes a constant stream of gaseous and solid pollutants. So vast, however, is the giant reservoir of the sky that the pollution, for all its volume, is soon diluted to infinitesimal concentrations. Compared to the hundred trillion tons of air overlying America, society's puny wastes are barely noticeable.

It is this pervasive dilution that makes air pollution such a complex technological problem. Control of pollution at its source, the only practical approach, is invariably expensive. Metropolitan Life is spending \$2,500,000 just on improving the incinerators in its four big Manhattan apartment projects; in Pittsburgh, home-heating costs were doubled by the ordinance prohibiting the use of cheap bituminous coal. Yet only in a few extreme instances has atmospheric

pollution ever been concentrated enough to constitute a hazard to health, and only occasionally, usually with the connivance of weather (as during the bad Los Angeles smog), has the concentration become strong enough to cause actual discomfort to humans or damage to vegetation. For the most part, the pollution in the air is just a nuisance, a violation of man's aesthetic sensibilities.

This does not, however, make air pollution any less a problem, for the subjective judgment as to what is and what is not a nuisance can change, literally, with the wind. Thus the smell of coffee in the kitchen is described as a "delicious aroma," but the same smell coming from a coffee-roasting plant is, to some people, a "foul pollutant." One big coffee processor, Eppens, Smith Co., has experimented with the Houdry catalytic fume burner (an industrial version of the platinum-gauze cigarette lighter) at its Long Island City roasting plant.

There is, of course, no way of avoiding the emotional subjective aspects of the air-pollution problem. Indeed, they are usually the controlling factors. There is good evidence, for example, that the pollution of the American atmosphere has actually been increasing at a pace considerably slower than the

recent growth rate of U.S. industry and population. The concentration of carbon monoxide in areas of heavy traffic has actually been reduced during the past thirty years through improved engine design. Similarly, coal, which accounted for 65 per cent of the nation's heat energy in 1925, now supplies only 35 per cent, the difference being taken up by cleaner-burning petroleum fuels. Yet, judging by public interest in the subject, air pollution is a new and suddenly dangerous phenomenon. Thousands of citizen action committees, some official, others belligerently anti-official, have been formed within the past two or three years. Even Phoenix, Arizona, whose most severe air-pollution problem has been an occasional sandstorm, has its Citizens' Committee on Air Pollution -- just in case. Nearly every town and city in the country has, in the last five years, either adopted an air-pollution ordinance or drastically revised its old one. New York, for example, in 1952 dissolved its Smoke Control Bureau and reconstituted its personnel, with expanded powers, as the Department of Air Pollution Control. This year, for the first time, President Eisenhower included federal air-pollution research among the recommendations in his State of the Union message.

And where did all this interest come from?

No single incident or development can alone account for it, but here are major contributing influences:

In 1948 the country was shocked by the death of twenty persons during a five-day smog in Donora, Pennsylvania. A stagnating temperature inversion (a layer of warm air over cold, instead of the more normal cold over warm) had been bottling up the atmosphere over large areas of Pennsylvania and Ohio, but only at Donora did the accumulation of fouled air reach lethal proportions. The Public Health Service immediately made a detailed survey but was unable to pinpoint the exact cause of the disaster, although sulfur gases, primarily from the burning of coal, seemed to be particularly suspect. (Four years later, in London, a similar smog had the effect of suddenly doubling the city's death rate; in two weeks an estimated 4,000 people died before their expected time.)

About the same time as the Donora disaster, the nearby city of Pittsburgh began an intensive campaign to erase its reputation as the "smoky city" of the nation. Pittsburgh's well-publicized success gave new heart to civic leaders all over the country; they now had a perfect answer to comments that "it can't be done." Pittsburgh had done it.

Counterpoint for Pittsburgh's success was the failure of every attempt to cure the Los Angeles smog. The Los Angeles problem was something new and different, and radio and television comedians saw to it that every home in the country was informed, in detail, about its eye-smarting properties. For the first time, moreover, the automobile was identified as a source of pollution, and this suddenly made air-pollution the concern of every car owner in the country.

At the same time an alarming increase in the incidence of diagnosed lung cancer (up 400 per cent in twenty years) led to a suspicion that urban air pollution was somehow involved. This belief has been strengthened by evidence from the Public Health Service that tars extracted from the air over ten cities were able to generate skin cancers on mice. Moreover, a British doctor claims that he has found a geographic correlation between lung-cancer incidence and the number of chimneys per acre. But other public-health experts are more cautious. Says Jacob Cholak, director of Industrial Hygiene Technology for the Kettering Laboratory, University of Cincinnati, "It is still safe to say that no definite, known disease has been caused by air pollution;

there's been a lot of speculation and discussion, but no proof except in unusual situations." Mr. Cholak was too polite to say so, but much of the "speculation and discussion" is generated by tobacco companies that see in cancer-from-pollution a convenient counter to the talk of cancer-from-cigarettes.

No influence, however, has been more important than simply the American public's increasing insistence on the "good life." Minor irritations, which once were accepted with fatalistic disregard as "costs of civilization," are no longer taken so lightly. In tiny East Greenville, Pennsylvania, for example, it was a delegation of angry housewives, carrying bundles of laundry soiled on the clothesline, that badgered the borough council into starting court action against the Boyertown Burial Casket Co. The casket company had got into trouble, not by producing more smoke than usual, but by continuing to be smoky in an era when housewives no longer correlated, even subconsciously, the grayness of their wash with the prosperity of their community.

The problem of air pollution puts a particular strain on modern, "enlightened" management. No one wants to be a nuisance, and the instinctive reaction

of most management men is to clean up their own backyards -- at any cost. Kaiser Aluminum is climaxing three years of research by building, for \$6 million, a complex of ducts and scrubbers and a 500-foot smoke-stack at its Chalmette reduction plant near New Orleans. By "shooting" superheated smoke and fumes up to an altitude of 1,500 feet, a scheme devised with the help of the N.Y.U. wind tunnel, (see picture, FORTUNE page 142), Kaiser hopes to end complaints that pollution from its plants is wilting flowers and discoloring houses. But Kaiser's action, no matter how commendable from the viewpoint of neighborliness, raises serious questions of basic economic worth. It is the public, through Kaiser's aluminum customers, that will eventually pay the \$6 million. Just possibly, it might have been more to the general public interest if Kaiser had chosen to take a tougher line and, for example, simply continued to reimburse its neighbors for any damage suffered.

WHO'S POLLUTING?

Actually, Kaiser, because of its suburban location, was in an enviable position to make its decision. The company at least had a good idea of what the alternatives were. Most companies, surrounded by other industrial or urban sources of pollution, can only guess at the extent to which they are contributing to the

general level of pollution. The few statistics available indicate that, on the average, industry itself is accountable for considerably less than half of the contaminants found in industrial atmospheres. When, for example, Donora had its tragic smog, the metallurgical plants in the valley suffered the blame. But two years later, when a strike closed down all industrial activity in the town, the sulfur dioxide content of the atmosphere (which had been used as the critical index) dropped barely 25 per cent.

In general, the public has only a hazy impression of its own contribution to air pollution. It is difficult to equate a thousand home chimneys, or a hundred thousand auto exhaust pipes, with a few big, belching smokestacks. The result is that industry is under constant public pressure to reduce the amount of pollution in the sky, while those applying the pressure do little or nothing about correcting their own faults.

Until now the inequity of this situation has been just an irksome phase of industry's largely voluntary air-pollution control program. But the size of that program has reached the point where industry can no longer ignore the public's crucial role. Current spending by industry on air-pollution research and equipment is estimated at over \$100 million (the chemical

industry alone says it contributes \$40 million). And this is only the beginning. If industry were to accede to all of the public's demands, the cost of air-pollution control could climb to a billion dollars a year, yet the desired result -- fresh air -- will be unattainable unless the public does its share.

There is, however, no assurance that the public will ever be willing to pay out of its own pocket for cleaner air. The automobile alone accounts for over 35,000 tons of pollution a day, and the only way this can be sharply reduced is to incorporate in the muffler some sort of catalytic converter or after-burner that will complete the oxidation of fuel residues.* Houdry converters, using a platinum-type catalyst, have operated successfully on factory fork-lift trucks for several years and are now being tested on automobiles. The trouble is, lead in the gasoline tends to poison the catalyst, and even if this difficulty is solved there remains the problem of persuading the public (or coercing it) to spend an estimated \$30 per family automobile as a highly personalized contribution to air-pollution control.

* As much as 7 per cent of the gasoline "consumed" by an engine passes through the cylinders unburned. This happens primarily during deceleration and idling. The automobile companies are working on a carburetor cutoff valve that should reduce this loss by at least half.

COMPROMISE --BY LAW

It is going to take Solomon-like wisdom for industry to act the part of the good neighbor and still not pass the limit of economic good sense. There are virtually no industrial processes that do not generate some smoke, smell, or dusts, and it is hardly possible for a company to put its plant beyond the reach of all sensitive noses. Few plants can afford to operate far from an established labor market, and the same factors that make an area attractive to industry -- water, transportation, level terrain -- are also conducive to residential development. Many plants, moreover, that were once "in the country" have been engulfed by the population move to the suburbs. And most communities have found it difficult to provide schools, roads, and sanitation without at least one taxable industry. The result is that many a company has been warmly invited into town by the local officials one day -- and condemned as a nuisance by the citizenry the next.

Since most air-pollution statutes are locally enacted and enforced, they tend to recognize industry's problems and to compromise between these and the general welfare. There is no federal statute covering air pollution (Eisenhower's proposal for expanded federal research is based entirely on the problem's public health

aspects), and only three states, Massachusetts, Oregon, and New Jersey, have statewide controls. A few counties, notably Pennsylvania's Allegheny and California's Los Angeles, have regulatory groups. For the most part, however, air-pollution control is a municipal function, generally to industry's great benefit. When Erie County (Buffalo) tried to enact a stringent smoke-control law, which had to have the unanimous approval of the municipal units within the county, the town of Lackawanna vetoed it, with Town Supervisor C.C. Couhig frankly explaining, "I am never going to vote for a law that would drive Bethlehem Steel out of Lackawanna -- especially when I know they pay 72 per cent of our taxes."

SUNLIGHT IN PITTSBURGH

The first city ordinance involving air pollution was King Edward I's proclamation (circa 1300) prohibiting the use of "sea coales" within London. It was not very successful, however, and by the time of Queen Elizabeth I's reign the prohibition was in effect only while Parliament was in session. In the U.S., Chicago was first, with an 1831 ordinance declaring that "dense smoke" was "a public nuisance." By World War I, nearly every major city had some sort of smoke-control law.

The present era of air-pollution control, however, dates from 1940 and the adoption in St. Louis

of the first truly effective smoke-control law. The law, which prohibited the sale of high-volatile bituminous coal within the city, had the enthusiastic backing of both industry and public, and results were spectacular. During the winter of 1939-40, the local weather bureau rkeported 716 hours of "thick smoke." By the following winter, this figure was down to 197 and it currently averages fewer than a dozen hours a year.

Before this lesson could be properly learned by other cities, however, World War II intervened, and it was not until about 1947 that Pittsburgh and Allegheny County, prodded by the Mellon-backed Allegheny Conference on Community Development, followed the lead of St. Louis. New city and county ordinances, incorporating carefully planned, staggered time schedules (e.g., homeowners had until 1953 to convert to smokeless fuels), eventually brought every smoke producer in the district under control. As in St. Louis, the results were spectacular. One estimate puts Pittsburgh's savings in laundry, house maintenance, and dry-cleaning bills alone at nearly \$25 million a year.

SMOG IN LOS ANGELES

The promoters of Pittsburgh made sure that the whole world heard about their "new" city, and this,

plus the disaster at Donora, did much to generate a national interest in air pollution. Nearly every city in the country either drafted new regulations or drastically revised its old ones. But almost within months these new laws, designed primarily to combat smoke, were becoming outdated. For on the West Coast, in the land of eternal sunshine, a brand-new kind of air pollution was developing, a formless sort of vaporous evil that defied the direct-action treatment that had been so effective in such smoke-darkened cities as St. Louis and Pittsburgh. It was eye-watering, voice-hoarsening, flower-wilting Los Angeles "smog."

The word smog, a contraction of smoke and fog, is a misnomer in Los Angeles, where smoke is not the major problem. In fact, Los Angeles, which depends primarily on petroleum products for heat and power, is as close to being smokeless as any city its size can hope to be.

One of the first men to tackle Los Angeles smog was Louis C. McCabe, a former Bureau of Mines fuels expert, who arrived in 1947 to take charge of the new county air-pollution control organization. Smog attacks had been building up steadily since 1942, paralleling the rapid growth of the city, and it was McCabe's job to eliminate the problem -- immediately. McCabe, after a preliminary

examination, decided that at least one of the trouble-makers was sulfur, a material he had encountered in the smoky cities back east. In Los Angeles, however, the sulfur gases came from petroleum, released during the refining process, rather than from coal-furnace chimneys. Largely at McCabe's urging (an epidemic of lawsuits from suburban truck farmers also helped), the local refineries began installing \$6 million worth of sulfur-recovery equipment. Eventually the sulfur content of the Los Angeles atmosphere was reduced below 1940 levels, but the days of irritating smog became even more frequent and severe.

HYDROCARBON VAPORS

McCabe had never promised that getting rid of sulfur alone would eliminate smog, but the public (and the newspapers) assumed that he had, and that they somehow had been cheated. The Los Angeles control organization has never recovered from the loss of confidence suffered at that time; even today recalcitrant companies use the sulfur incident as an excuse for non-compliance with the county regulations.

Meanwhile, McCabe returned to Washington, D.C., to become chief of the Solid Fuels Division, Bureau of Mines, and his successor, Gordon Larson, a West Pointer and former assistant to McCabe, had swung

the attack onto a new target, hydrocarbons. In 1950, Dr. A. J. Haagen-Smit, a biochemist at California Institute of Technology, discovered, while working on a research project for Larson, that typical smog damage to vegetation could be duplicated in the laboratory by using artificial sunlight to irradiate air containing traces of hydrocarbons and nitrogen dioxide (a compound that is normally formed in almost any combustion process). Los Angeles sunlight, Dr. Haagen-Smit reasoned, was certainly an effective source of photo-chemical irradiations.

Again the finger was pointed at the refineries (along with automobiles and backyard incinerators), but this time the oil companies were not so acquiescent. Since 1947 the Western Oil and Gas Association, representing nearly one hundred California companies, had been spending an average of \$250,000 a year for smog research by the Stanford Research Institute. Stanford, busy pioneering new instrumentation and testing methods, had come up with no results like Haagen-Smit's. Eventually the institute, along with other research organizations, confirmed most of Haagen-Smit's work (hydrocarbon control accounts for \$5 million of the \$25 million spent by Los Angeles refineries since 1947 on anti-smog devices and control equipment).

The public, however, was becoming increasingly

confused by the apparent disagreement among scientists, and this, on top of perplexing (and well-publicized) counterclaims by competing smog committees, pointed up the need for a central clearinghouse for information and research funds. In 1953 eighty of the city's community leaders established the Southern California Air Pollution Foundation to provide scientific stability, at least, for the fight against smog. In 1955, the foundation's second full year, its officers hope to collect over \$2 million from 126 Los Angeles individuals, industries, banks, and government agencies, the money to be distributed nationwide to research organizations now working on air-pollution projects.

THE GROWING THREAT

Late last year the S.C.A.P.F. shortened its name (and broadened its source of funds) by becoming simply the Air Pollution Foundation. This was done in the belief that Los Angeles was getting merely a foretaste of a malady that would soon engulf the nation. A unique combination of terrain, weather, and social habits (see map, FORTUNE page 145) has brought Los Angeles across the threshold of trouble first, but other cities, as the density of automobiles and the consumption of petroleum products continue to increase, presumably are not far behind. Almost every section of the

country experiences occasional days of the "temperature inversion" that has been Los Angeles' most characteristic feature, and on such days many persons in many cities have experienced the eye smarting that signals the formation of smog. What is more, Dr. Frits W. Went, a plant physiologist at Caltech who has made a specialty of smog damage, reports that just in the last few years he has begun to find typical smog marks on vegetation growing in the suburban areas of Paris and London.

Agreeing with the foundation that the problem is bigger than Los Angeles, the American Petroleum Institute has created its own air-pollution research program, taking over, on a broader scale, the work formerly financed by the Western Oil and Gas Association. Similarly, the American Society of Mechanical Engineers last month held its first International Congress on Air Pollution, and this year, for the first time, the Society of Automotive Engineers heard scientific papers on the automobile as a source of atmospheric pollution.

A SCIENTIFIC BASE

The result of all this new activity is the development of what someday may be a scientific base for air-pollution control. In St. Louis and Pittsburgh, the main aim was simply to reduce the total load of solid contaminants in the air. Soot, fly ash, and dust were the

principal problems, and all of the necessary equipment for their removal (bag filters, cyclone dust collectors, washing towers, electrostatic precipitators, etc.) was available if simple improvements in fuel-burning efficiencies were not enough to do the trick. The primary task of pollution engineers was to establish the most reasonable standards -- and to police the results.

Los Angeles smog, by contrast, does not contain any great quantity of solid contaminants. Instead, the trouble seems to generate from faint whiffs of gaseous chemicals, sources uncertain, which react in the sky, usually with the stimulus of sunlight, to form new compounds of unknown properties. To trace these reactions, taking place at such dilute concentrations, scientists have had to develop entirely new instrumentation and laboratory techniques. Similarly, weathermen have taken a new interest in micrometeorology, the study of extremely localized weather conditions. The miniature weather fronts created by local rivers, hills, and lakes are insignificant eddies on a national weather map, but for city dwellers they can mean the difference between invigorating weather one day and a stagnating atmosphere the next.

These new interests are today the frontier of air-pollution control. But even when they have been

reduced to a systematized science, civilization will still have to decide how much, exactly, it is willing to pay for fresh air. One thing is sure, it will never be cheap.

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APPENDIX "B"

Article entitled "SMOKE PREVENTION IS YOUR BUSINESS," page 59 et seq, from March issue of HEATING and PLUMBING ENGINEER:

WE HAVE FOUGHT HARD for the laws which guard the purity of the food we eat and the water we drink. Why, then, are most of us so indifferent to the protection of the air we breathe?

There is ample evidence to show that foul air brings sickness and death. In 1930, 60 people died in Belgium within five days when smog enveloped a small community. Two years ago a four-day smog in London, England, killed 4,000 people. As industry develops in Canada these tragedies could be repeated in Montreal, Toronto, or Vancouver.

Protection of health and life are in themselves sufficient reason why smoke and other forms of air pollution should be halted. But there are other reasons, too.

This year damage caused by smoke will cost Canada \$225 millions. Not only does smoke soil buildings and fabrics, it actually corrodes them.

In addition to this huge sum is the waste of precious fuel which smoke entails. Smoke is unburned

carbon, and a sure sign of faulty, inefficient combustion. The bigger plants are not often offenders as far as smoke is concerned. They know how to get the best out of a fuel. The culprits are the smaller firms using furnaces that have been wrongly designed or installed, or burning a grade of fuel unsuited to the equipment.

It is here that the heating contractor can help by selling and installing only equipment that has been properly designed to give complete combustion of the fuel.

Smoke abatement bylaws are a help in combating the menace of polluted air, but they are only a beginning. Not until everyone from school age up knows the cause, effects, and cure of smoke will the air of our cities be fit to breathe.

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"FOUL AIR KILLS MEN AND EATS DOLLARS"

FACTORY CHIMNEYS BRAVELY SILHOUTTED against the sky symbolize industry and wealth. The ones pictured at the top of the page (HEATING and PLUMBING ENGINEER page 66) might well introduce a film on the growth of Canada. But cover the lower part of the picture and the same four chimneys look ominously like gun barrels raking the heavens. Unfortunately the similarity is not in looks alone. The smoke innocently coiling from the chimney tops can be as lethal as a shell from a howitzer.

Over and over again it has been proved that smoke can be a killer. But because it kills less dramatically than unguarded railroad crossings, uncharted icebergs, or metal fatigue in a jet airliner, people are content for the most part to ignore it. The same attitude is true of otherwise responsible authorities who will spend large sums policing parking regulations but balk at expenditure for smoke control.

It is astonishing that nothing less than a major disaster arouses more than a fleeting interest in the protection of the most important commodity of daily life: the air we breathe.

Everyone consumes from 7,000 to 10,000 quarts

of air a day, so that the purity of this air is of paramount importance. Yet most of us take more interest in whether our bread is fortified with vitamin B1, or whether the cheese we occasionally eat is pasteurized.

Evidence to show that smoke is often lethal has been piling up as fast as industry has developed. In 1930 a small farm community on Belgium's Meuse River was visited by smog. By the end of the fifth day, 60 out of a population of a few thousand were dead.

Seven years ago at Donora, Pa., a December day began with what people thought was just another fog of the kind to which they had become accustomed over the years. Four days later this "ordinary fog" had killed 20 people, severely affected 1,440 others, and packed the two hospitals in the district with patients.

Few people have not heard of the London, England smogs which have been recurring with greater frequency and severity since 1952. These often last for days on end, crippling the world's biggest city, and killing people and animals. The official public health report states that the four-day smog of December 1952 caused 4,000 deaths. This does not take into account the sickness and premature death caused by excessive air pollution under normal conditions.

In most cities smog does not reach such

dramatic proportions, but the difference is only one of degree. The damage and the deaths occur in Montreal, Toronto and Vancouver just as in London, England. But because these calamities do not happen all at once, they are apt to pass unnoticed.

What does smoke do to the human system? It is well known in medical circles that disease thrives in dirty air, the ill effects of which are cumulative. Corrosive and irritating fumes wear down the respiratory tract and weaken its defense against bacteria. Allied with this is the fact that smoke cuts off 25% of the short wave ultra-violet rays present in sunshine. These rays have therapeutic powers and are the natural enemy of bacteria.

It is easy to check the filtering effect of smoke by comparing an hour of sunbathing in a city back yard with the same time at the country cottage.

Dr. Whaley, chief of the ear, nose and throat department at Toronto's Hospital for Sick Children, says there is no doubt that dust and dirt in the air play a part in causing trachetitis, a disease of the upper respiratory tract which afflicts children at the toddler stage. This disease is particularly prevalent in Toronto where from October to March inclusive, between 20 to 50 patients are admitted to hospital each month.

Some of these require an immediate operation of their lives are to be saved.

In Cincinnati deaths from pneumonia are 10 times higher in the factory basin than in the residential suburbs on higher ground. Manchester, England, centre of the "Black Country" has a climate sufficiently damp to make the city the hub of the cotton spinning industry. In addition, it has a severe air pollution problem and a death rate from respiratory diseases twice the average for the country as a whole. Coal tars are blamed for the high incidence of skin cancer among London's chimney sweeps.

Dr. Kingsley Kay of the Federal Health Department in Ottawa believes polluted air may be responsible for more cases of lung cancer than can be charged to cigarette smoking.

In these supposedly enlightened times, wherever people live and carry on business, there is smoke, plus a variety of other damaging and dangerous fumes. Contributing their share of impurities to the air are railroads, shipping, cement factories, smelting plants, asbestos mines, commercial buildings, cars, houses and incinerators.

The only reason why we usually escape tragedies on the scale of Donora or London, is that more often than

not the weather is on our side. Normally an obliging wind, or up-currents of air caused by the relatively warm city, carry away smoke and fumes before the concentration can reach a dangerous level.

Now and again, however, the weather is less co-operative and the polluted air, instead of being swept away and diluted, stays in the area and poisons people just as surely as if they had shut themselves in a garage with an automobile and left the engine running. When weather and smoke join forces in this way the result is smog.

First requirement for smog is faulty, wasteful combustion and the neglect of precautions for the removal of fly ash, soot, grit and other impurities from the burnt gases before they are released into the air. To the combustion engineer there is no such thing as a smoky fuel. There are only right and wrong ways of burning it. But before discovering how air pollution can be controlled at its source the particular weather conditions and other factors which favor smog will be considered.

Smog is likely to form on humid, overcast days because the moisture in the air acts as a carrier for the dirt particles and also as a blanket preventing the escape of polluted air. Wise housewives avoid hanging

out the washing on days like this not only because it will not dry satisfactorily, but because, if they live in or near a city, the clothes will come in blacker than they went out.

London's smogs usually occur between the beginning of October and the end of February, with December as the time of greatest danger. The average relative humidity (measured at 1,300 hours) during these five months is 76%. During the other seven months of the year it is 60% and fogs are rare.

Humidity is not, of course, the only factor. If it were, Vancouver, B.C., would have a more acute smog problem than it actually has because the average relative humidity there during the five winter months is 86%, compared with 76% for London, England, 73% for Toronto, and 69% at Dorval, Que.

Another weather phenomenon which can tip the scale between normal conditions and a severe smog is known as temperature inversion. Usually, the higher you get above ground the colder the air becomes. But sometimes, when the nights are cool, a layer of cold air forms close to the ground, topped by a layer of warmer air. This is the equivalent of a cold front on a local scale. The warm upper air acts as a lid preventing the escape of polluted air which therefore accumulates in

the cold stratum near the ground. Fruit growers when they lay a smoke screen over their orchards to save the trees from frost.

We have seen how weather can protect city dwellers from their folly, and how on other occasions it will be instrumental in causing smog. There is another natural feature which allies itself with smog and that is the topography of the city site.

Classic examples of cities built on sites dangerously favorable to smog are Donora, Pa., and Los Angeles, Calif. Donora lies in a valley with hills on either side. Under normal weather conditions the polluted air will escape, but temperature inversion could act as a top to the box formed by the hills. Since the disaster of 1948 a careful watch is kept on the weather and when temperature inversion is forecast, the zinc plants shut down.

Los Angeles is sandwiched between the Pacific Ocean and the range of mountains running parallel with the coast. In summer, when the land is warmer than the sea, the prevailing wind direction is onshore.

The air mass moving inland builds up a pressure against the mountains. At the same time there is an upward movement of air from the hot city with the result that a layer of stagnant air forms between the high pressure stratum

and the rising air stream. Smoke and fumes are unable to escape through this stagnant layer which acts as a lid over the city.

Loss of life and injury to health caused by foul air is serious enough but there is another side to the question -- the cost in dollars and cents. Smoke is a luxury nobody can afford. Ironically it is this consideration rather than the more abstract question of life and health, which is beginning to force home to public authorities and industries the necessity for action in badly affected areas.

In Britain annual losses caused entirely by air pollution are estimated at \$650 millions a year, or \$15 per person per year. Figures are not yet available for Canadian cities since many of them have taken up the cudgels against smoke only within the last four or five years. But in the first annual report issued by Toronto's Air Pollution Advisory Board a rough figure of \$10 millions a year is quoted on the basis of a loss of \$10 per person per year.

Here are some of the ways in which air pollution piles up the bills. In St. Louis, Miss., the city hall tower had to be dismantled because acid in the air had corroded the structure.

In Pittsburgh at one time laundry bills

topped \$30 millions a year.

A New York telephone company had serious trouble from dirty air causing wrong numbers. After a lot of research the trouble was cured by fitting electrostatic air filters in all exchanges.

In Boston, Mass., it is estimated that 10 lb. of airborne dirt enters the average home every month.

Huge sums are spent annually in industrial cities for the cleaning of buildings. Not only is the grime a poor advertisement for the occupants of the building but, depending on the nature of the fumes and solid particles in the air, it can be extremely corrosive.

In Toronto the Consumers' Gas Co. spent \$10,000 on a cleaning job for its head office building. The sum included repainting the windows and re-pointing the masonry. About one thirty-second of an inch of grime was removed. Although the job was completed only in November 1954 already the grime is collecting again. Also in Toronto, the King Edward Hotel has acquired a \$3,600 new look which is likely to prove just as impermanent.

On the positive side it has been reported that Pittsburgh's campaign against air pollution has saved the city annually some \$27 millions in public and private expenditure on cleaning, redecorating, and allow-

ances for depreciation resulting from the effects of smoke and fumes.

The type of pollution will naturally vary according to the industries carried on in a particular location.

In downtown Toronto much of the dirt is caused by imperfect combustion of soft coal in ships and railroad locomotives. Both these sources are outside the jurisdiction of the city smoke abatement bylaw.

In Vancouver, B.C., shipping is also a source of worry to the authorities, with the lumber mills of North Vancouver as a runner-up.

It is easy to understand the anxiety of people who live near a lumber mill in view of the fact that a typical sawmill boiler generating 100,000 lb. of steam per hour may discharge up to $2\frac{1}{2}$ tons a day of scorched, unburned flyash into the air. It is almost impossible to control this by adjusting combustion conditions because the waste wood used as fuel comes in a great variety of shapes and sizes from fine sawdust to chunks of bark. Some of the wood is dry, some soaking wet.

An answer to the flyash problem has been found by Macmillan & Bloedel, one of the city's largest lumber operators. This firm is a member of Vancouver's Kleneair Society which is a group of organizations and

individuals seeking to reduce the smoke and cinder nuisance in the Vancouver area.

Macmillan & Bloedel has fitted to the boilers a device known as a "multi-clone" precipitator which imparts a whirling motion to the flue gases by means of fans. The action is much the same as that of a cream separator. Solid particles are thrown to the walls of each of a group of tubes, and the particles, mostly unburned carbon, are then returned to the furnace for a second pass through.

By this method as much as 90% of the flyash is precipitated before it gets into the stack. As well as practically eliminating air pollution this raises the Btu output per pound of fuel. Part of the \$500,000 Macmillan & Bloedel is spending on this combined program for greater fuel efficiency and the reduction of flyash will provide extra boiler capacity. It has been found that the fuel is consumed more efficiently if the boilers are not pushed to their limit.

Sulphur dioxide in the air poses one of the most serious pollution problems. This gas is a common waste product and tons of it may enter the air from factory chimneys. It occurs in particularly high concentrations where smelting is done. The gas itself is poisonous but it is also readily oxidizable to sulphur

trioxide. On humid days the process goes a step further with the combination of sulphur trioxide with water to form sulphuric acid. One of the strongest acids, it will corrode steel, stone, and human lungs.

At the big smelter city of Trail, B.C., 95% of the sulphur dioxide fumes are captured in the smokestacks to make ammonium sulphate, a valuable artificial fertilizer. This is another example of how the prevention of air pollution goes hand in hand with economy.

In asbestos country there is yet another brand of air pollution -- asbestos dust -- which alarmed the local population long before smog made sensational headlines in London, Los Angeles and San Francisco. Asbestos companies are currently spending \$4 millions on the control of this nuisance and it is estimated that by 1956, dust should have almost completely disappeared.

Progress of the war against dust which has been waged for many years in towns like Asbestos, Thetford Mines and Black Lake, is exactly measured by the reduction of the dust count. Maurice Lachance, ventilation engineer in the asbestos district says the count per cc. of air has been reduced by 50% since the campaign began. No one expects the dust count to rival that near the North Pole where a cc. of air contains a mere 300 to 400 particles, but it is already lower than that

of the average industrial city where 300,000 to 400,000 dust particles crowd each cc. of air.

"Compared to most city dwellers," Mr. LaChance says, "the Asbestonian breathes fresh, clean air."

Unburned carbon is the chief trouble maker in city air. It is generally not the bigger power plants that offend. These are run by qualified engineers who know how to get the most out of fuel. In any event large firms are not anxious to get a bad name in the city as smoke makers. The culprits are the smaller commercial and industrial establishments operating badly designed plants, burning the wrong type of fuel, or burning it in the wrong way.

Stringent anti-smoke laws have helped in some cities to reduce air pollution, but the only complete answer is a sustained, country-wide educational campaign stressing these two points:

- 1--smoke is a serious health hazard;
- 2--smoke is a sure sign of inefficiency in the use of fuel.

Canadians have fought hard for the pure food laws that guarantee our food is uncontaminated. We have organized and paid for expensive water systems that give us a plentiful supply of pure water. There are heated debates on the question of whether this water

should be fluoridated to prevent tooth decay. But due to some inexplicable oversight we have to date almost completely overlooked the importance of breathing clean air.

In some parts of England the cause, effect and cure of smoke is now a high school subject, and radio and television programs have aroused public interest in smoke prevention. This is a lead which should be followed elsewhere because not until everyone is his own smoke inspector will city air be fit to breathe.

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"WIDER CONTROL OF AIR POLLUTION URGED IN TWO CITIES"

Vancouver - An active group of firms and individuals called the Kleneair Society is fighting a battle to make Vancouver's air fit to breathe. It's a hard battle with many setbacks and discouragements.

One discouragement happened recently when a meeting of lower mainland reeves and mayors was called to discuss a Kleneair Society proposal for a metropolitan air pollution control board. At this meeting Mayor F. H. Jackson of New Westminster said: "If we want industries we have to have smoke." Most of those present seemed to agree with him.

In spite of this attitude the Kleneair society is going ahead with plans for a metropolitan air pollution control board -- with the promise of support from Vancouver Board of Trade.

"I was very disappointed at the parochial attitude of New Westminster," President Charles Hamilton told a regular meeting of Kleneair directors. "But other municipalities said we had made progress and that it was a matter of hammering away."

At the lower mainland conference of mayors and reeves Mr. Hamilton had suggested that the air pollution control board be financed on a per capita basis.

"This is not a Vancouver deal but a metropolitan matter", Mr. Hamilton explained. Reiterating his theme, industries mean smoke Mayor Jackson replied: "We can't have our cake and eat it too".

However, the Kleneair Society is not alone in its fight against smoke. About a week after the lower mainland conference the Institute of Power Engineers was told by President James Coldwell that local industry badly needs technical guidance in the fight against smog.

Mr. Coldwell pointed out that Los Angeles employs physicists on its smoke abatement council, but added: "There's not much chance of us getting scientific help here in a city this size".

The Institute decided to take matters into its own hands in preparing power engineers for eventual installation of anti-smoke equipment with technical talks by several experts.

Members of the IPE then saw slides depicting the improvement various devices can make in cutting down fumes and solid matter in smoke. The slides were shown by A. L. Nicholls of Kemp Agencies Ltd., the firm responsible for installing smoke control equipment at White Pine division of MacMillan & Bloedel Ltd.

Commenting editorially on Mayor Jackson's remarks the Vancouver Province said: "To say there is

"nothing that can be done about pouring smoke into the air is the worst sort of defeatism. Also it is not correct. Industries in British Columbia have demonstrated they can cut smoke. It takes money and it takes effort, but it can be done. The public's elected representatives should encourage smoke control, not discourage it."

The paper went on to say that science is only just beginning to tell the story of smoke and smog as a killer. Vancouver is not yet heavily industrialized, but the weather favors smog. "All we need to do is to add enough smoke and we can have just as deadly a mixture to breathe as London, England, or Los Angeles."

In Toronto, Robert Macaulay (P.C. for Riverdale) recently called the legislature's attention to the problem of air pollution in Toronto and other industrial centres. He said control of smoke is obviously beyond the scope of individual municipalities and even beyond that of the Metro council, and pleaded province-wide control.

Mr. Macaulay told the legislature that during August, 1954, 210 tons of soot and ash fell on his riding of Riverdale. This, he said was 40% of the total amount which fell on the city.

Railway roundhouses were the worst offenders in producing pollution, he said. "One factory in my

riding discharges so much zinc oxide from its chimneys that recently the company was forced to resurface 100 cars whose finish had been damaged by the discharge from its chimneys."

He said that some of the factories in the city have installed dust collectors in their smoke stacks. "One company on Bathurst St. found that it was collecting 3,000 lb. of zinc oxide in its dust collectors every day. Another factory collected 14,000 lb. of fly ash from the chimneys every day. Imagine what this material was doing to the lungs of the people when it discharged into the air."

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APPENDIX "C"

Article entitled "SMOKELESS STACKS SEND PROFITS SOARING", page 55 et seq, from May issue of HEATING AND PLUMBING ENGINEER.

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"NO SMOKING" has been the law for Toronto's chimneys since 1950. Unlike the rules enforced on streetcars, in movie theatres and other public buildings, this law is not always kept. If it were, Torontonians would save \$10 millions a year and the city would be a healthier, pleasanter place to live in.

In the \$10-million estimate -- a conservative one at that -- are included waste of fuel, dirt and damage. But this is only a part of the toil taken by smoke. It is impossible to assess in dollars and cents the cost of ill-health and premature death for which polluted air is directly responsible.

Vancouver, too, has made a start in tackling what is the most serious problem confronting industrial cities today; how to make their air fit to breathe. The excellent progress of Vancouver's campaign waged by the smoke abatement department and by the active Kleneair Society is proved by the dramatic reduction in dust fall within the city over the last six years. Taken at all different sampling stations within the

area covered by the by-law, the figures, in tons per sq. mile per month are:

1949.....	32.0
1950.....	27.5
1951.....	25.6
1952.....	22.4
1953.....	19.6
1954.....	21.2

This is encouraging but, if a quarter of the facts about air pollution were generally known there would be little need of laws to enforce smoke control. Everyone would be his own inspector and the purity of city air would be as jealously guarded as that of water and food.

Antismoke laws are not new. In 1580 Queen Elizabeth forbade the burning of coal in London while Parliament was in session so that "The health of knights would not suffer while they were residing in the metropolis." In 1307, a man was executed for burning coal in a furnace.

The sources of air pollution have multiplied frighteningly since then. But there are still only a few Canadian cities where smoke abatement by-laws are enforced and none where the smoke discharged by railroads and shipping can be controlled. The federal statute governing emission of smoke by locomotives has not been amended since it became law in 1908.

Director of Toronto's smoke abatement department is J. B. R. Neilson, a Scot from Glasgow. He is one of the busiest men in City Hall. Assisted by chief inspector W. W. Norgate, eight inspectors, and a clerk, he directs the policing of 35 square miles of territory, issues about 370 installation permits a year, handles about the same number of complaints by letter and by telephone, holds meetings with the railroad and shipping authorities, and somehow finds time to attend air pollution conventions in different parts of Canada and the United States.

All the work of the department is done on a slim budget of \$50,000 a year -- one-half percent. of the estimated annual damage done by smoke. At the same time plans are being made to extend the scope of the department so as to control, eventually, all sources of air pollution in the city. A step in this direction was taken in May, 1954, when the Toronto city council agreed that the name of the smoke abatement advisory board be changed to "Air Pollution Advisory Board".

At the present time Mr. Neilson's inspectors are fully occupied checking complaints of smoking chimneys without concerning themselves with other sources of air pollution.

No by-law can be enforced without penalties, but the smoke inspectors are not merely policemen. They would be better described as combustion engineers since the most important part of their duty is to advise firemen and engineers in charge of plants how to burn the fuel so as to get the most out of it and thereby avoid smoke.

Even if the operators do not respond to the argument that smoke is a danger to health, they will often listen when it is pointed out that smoke is unburned fuel, and indicates that up to 30% of the heat content of fuel is being lost.

In order that smoke inspectors can talk with plant engineers at the highest level and offer advice with authority, they are all first class engineers.

Education is a vital part of the city's battle against smoke. Mr. Neilson emphasizes that issuing summonses is no solution in itself. The problem is first to get people to realize that smoke is a hazard no less dangerous than polluted drinking water or contaminated food. Once this point has been driven home, they must be shown that smoke is simply a result of faulty combustion of wrongly designed equipment and that it can be cured.

When a complaint is received by the department

and an inspection shows that it was justified, the inspector may be able to suggest a cure for the trouble by altering the method of stoking or by using a different fuel. If the owner refuses the advice and the smoke continues, two or three warnings are issued before the matter is taken to the courts. For a first offense the fine is \$20. The third time it could be as high as \$200.

These are the more important provisions of the law:

1. Smoke or other products of combustion too dense to be seen through at the point of emission must not be discharged for a period of more than six minutes in any one hour;

2. Smoke of medium density must not be discharged for a period of more than 10 minutes in any one hour;

3. Boilers over 50hp must have smoke indicators fitted to their stacks unless the stack can be seen from the boiler room;

4. Fuel burning equipment must not be installed or altered without a permit from the smoke abatement director. Minor repair work, and alterations which do not change the fuel burning capacity of the equipment are, of course, allowed without a permit.

On the permit application form a number of

questions are asked from which the inspector is able to tell whether the fuel will be properly burned. According to Mr. Neilson, the most important question is: "Describe facilities for admitting air to the boiler room".

Two frequent causes of smoke, Mr. Neilson said, are starving the boiler room of air, and having insufficient grate space. The latter should be at least equal to the diameter of the boiler shell. Size of the chimney is also important and the air inlet to the fire should be at least 50% bigger than the cross-section area of the chimney.

Supervision of equipment design ensures that the fuel will have every chance of being properly burned. But the best possible equipment is useless if the fireman is ignorant of proper stoking methods, or if an unsuitable grade of fuel is used.

Fairly typical of the eight smoke control districts into which Toronto is divided is the one patrolled by Inspector George Gould. A first class engineer, Mr. Gould has operated a number of heating and power plants in Toronto including that of the Gair Paper Co. and the General Hospital. Before coming to Canada from Greenock he was a marine engineer.

In his territory are plants of all sizes

ranging from the giant boilers at O'Keefe Brewing Co., down to antiquated hand-fired installations. It is the smaller plants that need watching. The larger ones are usually run by experienced engineers, and in any case the bigger firms are anxious to avoid the unfavorable publicity which a court conviction would bring them.

A smoke inspector's job is not an easy one, especially in winter. He has to cover his area on foot, or by public transport, and must observe offending chimneys for a full hour before taking action. Illustrative of the kind of problems the inspector meets are three installations in Mr. Gould's area.

First, a small hand-fired, coal-burning furnace used to heat a car-hire establishment. After a complaint had been made that the chimney was smoking badly, inspection by Mr. Gould revealed that almost every rule of efficient combustion had been broken.

The fire had been allowed to drop to a low level before fresh coal had been heaped on it. Thus the fire was not hot enough to burn the volatile matter of the green coal.

The boiler room vent was at ceiling level so there was a danger of the warm air at that level acting as a cushion against entry of fresh air from outside.

Soot covered the flue to a depth of two inches, and a soft, high volatile coal was being burned.

Although this was not the first time that complaints had been lodged about the establishment, Mr. Gould again warned the owner that he should use a better grade of fuel, that the fire should be stoked more often and less heavily, and that the flues should be kept clean.

Mr. Gould pointed out that a fuel costing \$5 or \$6 more per ton would be more economical because it would produce less soot. He also reminded the owner that 1/8 inch deposit of soot on the flues can cut down heat transfer by as much as 5%.

In this case advice and warnings were ignored and ultimately the owner was fined \$25 in court.

An example of co-operation between inspector and fireman is provided by a small food factory in Mr. Gould's area. In this factory, process and heating steam is supplied by a coal-fired boiler fed by an automatic stoker. At first there was some trouble with smoke, but over a number of visits Mr. Gould has taught the fireman how to tend the fire so as to prevent smoke when the green coal starts to feed in from the bottom. The owners have also switched to a more suitable grade of coal.

Also in his district is the modern plant operated by Simpsons-Sears Ltd., producing 20,000 to 30,000 lb. of steam per hour. Originally the stacks were not fitted with smoke indicators, but at Mr. Gould's suggestion an electronic device used for counting catalogues in the binding department was adapted for use as a smoke indicator. The device is connected to an alarm signal and works admirably.

Vancouver's smoke abatement division, consisting of the chief inspector, three assistants and a stenographer, functions on an annual budget of \$21,150.

This is a small force to cover so large an area but the division is not alone in its battle for clean air. Vancouver is fortunate in having such groups as the Institute of Power Engineers, the Kleneair Society, and the Community Planning Association of Canada to help promote public interest in ridding Vancouver of its smog.

The local press also helps by reporting progress of the campaign from time to time, and by publishing editorials on the causes, cure and effects of smoke. A well informed public opinion is probably the most powerful weapon a city can mobilize in the antismoke battle.

Chief sources of industrial smoke over the

lower mainland are the numerous lumber and shingle mills which burn wood refuse as a fuel. The wood varies in type according to what has been cut in the mill at the time, and it can vary in moisture content from bone dry to approximately 60% moisture. In face of these wide variations it is impossible to keep the fuel air ratio adjusted to give the most efficient combustion conditions.

Smoke from these mills has been cut to some extent by the use of dutch ovens, overfire jet air systems, by arranging for a more thorough mixing of the fuel before burning and by fitting electronic smoke indicators.

Mill waste burners are another serious problem. These discharge large quantities of smoke and fly ash. To combat this nuisance several amendments have been made to the by-law, among them a clause which states: "No solid matter may be emitted from any source in excess of 450 grains per 1,000 cubic feet of gas at 68 deg. adjusted to 50% excess air."

Chief smoke inspector J. Satterthwaite reports that particular attention will be paid to newly installed incinerators. The by-law will require these to have an auxiliary heat source to prevent any

odor and smoke and settling chambers to reduce the velocity of the burned gases sufficiently for fly ash particles to settle out.

Vancouver's smoke inspectors must hold a second class (or higher) certificate and have five years' experience in the operation of steam power and heating plants. As in Toronto, the Vancouver division is concerned chiefly with smoke control. Four men could not hope to cover air pollution in all its aspects.

The division is severely handicapped in its efforts because Federal installations, Department of Transport equipment, and plants in adjoining municipalities are all outside its jurisdiction.

Formerly the railroads contributed a great deal of smoke but locomotives are now almost all dieselized. The Great Northern Railroad is 100% dieselized.

Also on the credit side is the modernization of school heating systems which the Vancouver school board is carrying out. Hand-fired coal furnaces are being replaced by oil-burning equipment fitted with smoke indicators. Apart from the reduction of smoke which this should bring, it is good to know that the rising generation will be aware of smoke

control at the most impressionable time of their lives.

Plans for all new installations of fuel burning equipment are submitted to the city smoke inspector for approval. His check takes into account the size and volume of the furnace, size and location of chimney and breeching, the fuel burning rate and other factors affecting the clean and efficient operation of the plant.

Supervision does not stop there. As soon as the plant is in operation the district inspector makes an inspection and if it is satisfactory, an operation permit is then issued.

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APPENDIX "D"

Article entitled "CITY SMOKE SCREENS HIDE AIR-BORNE KILLERS", page 46 et seq, July issue HEATING and PLUMBING ENGINEER.

CANADA'S CITIES ARE CLOUDING up their skies with a smoke screen that forms a serious potential health hazard. It is almost certain that air pollution is one of the main causes responsible for the climbing incidence of lung cancer. Many other respiratory diseases thrive in dirty air. In addition this air-borne filth costs Canadians an estimated \$150 millions a year.

Air pollution has even given our language a new word -- smog. A contraction of smoke and fog, it describes an unpleasant eye-smarting, stifling condition of the atmosphere that can develop in any city given certain weather conditions and inhabitants who are not too careful about how they burn their fuel, garbage and gasoline.

Transport, water supply, sewage disposal -- all these community problems have been solved long ago. Air pollution has not yet been solved and will not be solved until its cure is approached in a more scientific manner.

Most large cities have had smoke abatement bylaws for some years but it has taken three major disasters in the postwar period to highlight the potential danger to health which air pollution constitutes.

In Donora, Pa., in 1948, 20 lives were lost during a severe smog. At Poza Rica, Mexico, in 1949, 22 people died as a result of breathing air polluted by a petroleum plant. Investigation of the loss of 4,000 lives in London, England, in 1952 during a smog fixed the blame firmly on air pollution.

What is air pollution? It consists of particles, droplets of liquid and gases. Air sometimes becomes laden with dust or gases of natural origin but natural pollution is relatively unimportant compared with man-made smogs.

There are no standards of cleanliness for air. If the concentration of certain pollutants is below an arbitrary level it is assumed to be clean.

There is another difficulty in the way of establishing a standard for pure air. Present-day activity leads to the discharge of pollution containing almost all of the known elements in various combinations, though research has established that certain pollutants predominate.

Particles are generally of two types. The

small sizes are acid-bearing droplets or particles high in carbon content from imperfect combustion of fuel. These appear in the atmosphere as smoke or haze. The large particles are mainly ash from fuel burning and quickly settle to the ground.

Of the pollutant gases sulphur dioxide predominates in most urban atmospheres. For this reason such standards of pollution as are now in use mostly concentrate on the number of particles in the air and the amount of sulphur dioxide. Current research may direct attention to other substances occurring, in smaller amounts but which have specially harmful properties. In Los Angeles smogs, nitrogen oxides, ozone and products of gasoline combustion have been identified.

It has been recognized for many years that most urban pollution arises from the burning of coal and other fuels. Investigations after the Donora disaster disclosed that the main sources of pollution were zinc smelters, waste heat boiler stacks and blast furnaces.

It is known in Britain that coal burning contributes the major pollution load in that country. Domestic firing has been established as a significant factor in some cities. This was found to be the case in the investigations of air pollution in Toronto in 1934-37.

Research on the pollution in Los Angeles has indicated that combustion of gasoline by automobiles represents a major contribution to urban air pollution at least in that city.

Investigation at Poza Rica showed that hydrogen sulphide from a refinery was responsible. A case in the Canadian Northwest Territories investigated by the author was found to be the result of arsenic dispersion from ore roasting.

It is evident from these examples that air pollution can have many sources and it is not always easy to apportion the blame.

Pollution varies daily and seasonally and it also depends on the weather. On Monday morning in winter, pollution is generally at its worst in many cities because at that time plants are firing up after the week end.

In the Donora disaster it was found that exceptional weather stability caused an accumulation of pollution which would normally be carried away by turbulence and surface wind. This stable condition resulted from low surface wind velocity and an abnormal period of temperature inversion -- a reversal of the normal decrease of air temperature with height. The same conditions prevailed at Poza Rica the following

year and in the London disaster of 1952.

Temperature inversion has long been known to be a feature of weather in our climate occurring in early morning and evening when the ground is cooler than the air above. This normal inversion will also cause some accumulation of pollution but its diurnal character has to date apparently prevented dangerous levels of pollution being maintained for long enough to cause ill-effects to those living in Canada's urban areas.

To assess the importance of pollution in an area these three factors must be taken into account: local terrain.

EFFECTS OF AIR POLLUTION

The cost of smoke in terms of unburned fuel, dirt and damage has hitherto been the basis for most smoke abatement programs but recently evidence has come to hand clearly demonstrating the effect of pollution on health.

Air pollution is a wasteful practice. It costs the American public an estimated \$600 millions per year. Smoke is known to represent fuel lost by inefficient burning. In 1945 the Department of Scientific and Industrial Research in Britain estimated that the equivalent of five and one half million tons of coal were wasted to the atmosphere in that year.

For sulphur dioxide the estimate was five million tons wasted. Valuable sulphuric acid and sulphate chemicals can be manufactured from this gas as was demonstrated by the Consolidated Mining & Smelting Co. at Trail, B.C., in 1930. At this time the International Joint Commission ordered a substantial reduction in discharged sulphur dioxide owing to damage to orchards across the border in the state of Washington.

The process at Trail uses sulphur dioxide in the manufacture of fertilizer and has been an important source of revenue to the company.

More recently there has been a sulphur shortage throughout the continent. This has directed further attention to the waste of sulphur dioxide to the atmosphere.

At Los Angeles it has been shown that many industrial effluents contain valuable materials the resale of which will more than pay for the cost of recovery equipment.

Damage by smoke and gases in cities has also been investigated. Experiments on metal corrosion in Pittsburgh showed that the life of sheet metal and copper was more than twice as great in smoke-free areas. In St. Louis where a vigorous campaign against pollution has been under way evidence of big reductions in laundry

and cleaning costs has been noted. One hotel reports a 30% reduction.

Records at Detroit show that airlines suffer heavy financial loss when smog reduces visibility at airports.

Reference has already been made to the three major air pollution disasters which have occurred during the last five years. These episodes in widely separated centres have demonstrated the appalling consequences of an accumulation of pollution in stable weather. Within hours of the onset of the inversion conditions acute respiratory and heart symptoms developed.

In London unusually dense fog developed on December 5, 1952, and continued for four days. As London continuously records the load of solid pollution and sulphur dioxide, records were available indicating levels for these constituents never reached since recording began in 1932.

Investigation of the causes of death in the period disclosed that respiratory diseases had increased during the week of December 13 to nearly four times the level of the previous week.

It was notable from the records that the levels of sulphur dioxide were lower at their maximum than had been noted in many other centres at other times. The

solid pollution, however, was higher than had ever been reported in cities with high sulphur dioxide levels. This suggests that sulphur dioxide or other gases may combine with particles in the air to create a highly poisonous pollution load.

Another aspect of pollution is the potential chronic effect of living in polluted city atmospheres for long periods. An authority in England who has compared the incidence of lung cancer in urban and rural areas of England believes that there may be a relationship between lung cancer and air pollution. His findings show that lung cancer has approximately doubled in England between the two periods 1936-39 and 1945-49.

Analysis of the health of rural and urban dwellers disclosed that for the period 1921 to 1946 urban dwellers suffered death from lung cancer twice as frequently as the rural dwellers.

In London he found the death rate from lung cancer was two and one half times that for rural districts. By comparison with other cities in England he found that the rate of lung cancer varied according to the size of the urban area.

In Los Angeles, a research team last year isolated from air pollutants material which proved potent in producing cancer in mice.

A wide variety of engineering and other techniques for control of air pollution at source have been developed. Most cities today administer bylaws against pollution. If the nature, distribution and sources of the pollution have been carefully assessed and considered in relation to the new findings on health effects, a rational program for control can be pursued. Community co-operation in planning is strengthened when the exact nature of pollution is known. This approach has greatly reduced smog in Los Angeles.

Pittsburgh and St. Louis have also developed programs based on thorough assessment of the problem. In St. Louis this has led to a reduction of 80% as between average sulphur dioxide concentrations for the years 1936 and 1951. It is now certain that the success of control efforts in any area is heavily dependent on the extent of knowledge of the pollution characteristics of the area.

There is no lack of equipment for collection of wastes at source but the initial cost for such equipment is high. On this account it is particularly important that authorities administering regulations should be able to present sound scientific evidence for the control requirements.

Domestic pollution remains a serious problem.

It is difficult to control the multitude of small sources of pollution represented by the heating systems of homes and individual incinerators. Extensive research on more efficient coal furnaces is being carried out at the University of Illinois and at the laboratory of Bituminous Coal Research Inc. New coal furnaces of more efficient design are on the way and should offer big savings to the consumer as well as a reduction in smoke.

Some authorities believe that the increasing use of fuel oil will reduce domestic pollution. It is true that smoke is reduced but it remains to be established that effluents from burning of fuel oil do not also contribute to the pollution load. Gasoline combustion is known to cause pollution.

In Canada a marked trend from rural to urban living and a striking increase in industrial activity have developed since the beginning of the war. These factors have added emphasis to the need for careful exploration of pollution in all Canadian cities.

At the present time long-term published data are available only for Windsor, Ontario, where air pollution has been under investigation by the International Joint Commission for six years. A comparison of levels of sulphur dioxide with the figures for London during the 1952 disaster indicates that the maximum for 1950-51

in Windsor was twice as high as that during the peak of the London fog. But solids in Windsor air did not reach a maximum of greater than approximately one eighth the level reached in London at that time. As it is now believed that high values for solids in the air form one important aspect of disaster conditions, it may be supposed that the danger of such conditions occurring in Windsor is far below that for London. It is also of interest that during 1951, average sulphur dioxide in air was at a level around two and one half times the average for St. Louis which had been benefitting from an elaborate campaign of air pollution control.

A thorough investigation of dust fall in Toronto was carried out in the year 1934 to 1937 by the School of Hygiene of the University of Toronto. It was clear at that time that bylaws for smoke abatement were fully justified. The author was associated with that investigation and made a special study of the loss of sunlight caused by the smoke layer over Toronto. It was found to cause a loss of approximately 40%.

These are some of the groups fighting air pollution:

- 1 - The Canadian Manufacturers Association has a special committee on air pollution. A study in Sarnia, Ont., was started several years ago with

industrial backing and is being carried out by the Ontario Research Foundation;

2 - The Canadian Standards Association is working on a standard pollution code;

3 - A special commission was set up by the Ontario Legislature in March to study the question. Previous to this, action by Provincial Governments was confined to special cases of pollution;

4 - Through the Department of National Health and Welfare, the Federal Government has been concerned with the problem for a number of years.

In Windsor this department is now investigating the possible effects on health of air pollution. Fundamental research on air pollution is also being carried out and new techniques have been developed in this field.

The London disaster has stimulated interest in the possible effects of mixtures of air-borne particles and the common gaseous pollutants. To examine this aspect of the problem the department has built a special chamber in which atmospheres of controlled composition can be created. Experimental animals are then exposed to these atmospheres.

Lack of data on pollution in Canadian cities may indicate that air pollution is not a serious problem in this country at the present time. On the other hand

owing to the rapid growth of urban centres during the last few years many cities may only now be reaching pollution conditions comparable to those in other parts of the world where disasters have occurred.

It is therefore vital that air pollution be assessed or reassessed in all Canadian cities even though evidence of ill-effects to health may not yet have appeared.

Only when scientific study underlies control programs will pollution be significantly reduced.

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Note: Tables for this article follow, commencing D-14.

TABLE I -

DEATHS REGISTERED IN GREATER LONDON FROM
WEEK ENDED NOV. 15, 1952, TO JAN. 10, 1953, COMPARED
WITH THE ANNUAL AVERAGE FOR CORRESPONDING WEEKS OF
THE FIVE PREVIOUS YEARS, 1947-52

Deaths in week ended									
Year	Nov. 15	Nov. 22	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3	Jan. 10
1942	1565	1699	1902	2062	4703	3138	2234	2977	2634
1947-52 (av.)	1747	1708	1809	1805	1852	1914	1923	2303	2213

Table 18. Pollution Emitted from Coal in Great Britain,
Million Tons per year.

	Coal Used	Smoke	Ash	Sulphur dioxide	HCl and other chlorides
Domestic purposes:					
fires..... 45)	65	1.2	0.2	1.5	0.1
gas and electricity 20)					
Industrial boilers	65	0.9	0.3	2.1	0.2
Other industrial uses ..	50	0.3	0.1	1.6	0.2
Total	180	2.4	0.6	5.2	0.5

TABLE V -

NUMBERS OF DEATHS ASSIGNED TO VARIOUS CAUSES,
LONDON ADMINISTRATIVE COUNTY: WEEKS ENDED NOV. 29,
1952, TO JAN. 3, 1953

Cause of death	Week ended					
	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3
Respiratory tuberculosis ..	19	14	77	37	21	24
Cancer of lung	27	45	69	32	36	48
Vascular lesions of C.N.S..	98	102	128	119	91	131
Coronary disease	131	118	281	152	109	150
Myocardial degeneration ...	79	88	244	131	108	136
Influenza	7	2	24	9	6	4
Pneumonia*.....	28	45	168	125	91	104
Bronchitis	73	76	704	396	184	215
Other respiratory diseases.	8	9	52	21	13	10
Motor-vehicle accidents ...	1	8	4	10	4	5
Suicide	5	10	10	7	5	12
TOTAL (all causes)	853	945	2484	1523	1029	1372

* Excluding deaths at ages under 4 weeks.

THE COST OF SMOKE

1. Cost to smoke-maker:	
Imperfect combustion	1,983,570
2. Cost to individual:	
Laundry bills	1,956,522
Dry cleaning bills	978,258
3. Cost to household:	
Exterior painting	430,434
Sheet metal work	1,314,780
Cleaning and renewing wallpaper....	717,390
Cleaning and renewing lace curtains	469,566
Artificial lighting	
4. Cost to wholesale and retail stores:	
Merchandise	2,152,176
Extra precautions	586,956
Cleaning.....	978,258
Artificial lighting	847,824
Department stores	228,258
5. Cost to quasi-public buildings:	
Office buildings	117,390
Hotels	28,698
Hospitals	71,736
	12,971,274

	<u>Years</u>	
METAL	PITTSBURGH	SMOKE-FREE CITY
Galvanized sheet iron	3 - 6	7 - 14
Galvanized sheet steel	3 - 4	5 - 10
Tin sheet, iron	13 - 15	18 - 28
Tin sheet, steel	6	10
Copper	10 - 20	Indefinitely

APPENDIX "E"INVESTIGATION OF SULFUR FUME INJURY

District of Sudbury - 1955

Introduction

At the request of Dr. J. D. MacLachlan, President, Ontario Agricultural College, Guelph, three staff members, Dr. D.N.Huntley, Head, Department of Field Husbandry, Professor T.H.Lane, Department of Soils and Dr. O.T. Page, Department of Botany, visited the District of Sudbury on July 4th to 8th and August 3rd to 7th, 1955. The purpose of this visit was to observe the extent and severity of sulfur fume injury apparent in this District. Under the direction of Mr. R.H.Murray, Arbitrator, Ontario Department of Mines, farms were visited within an approximate 25-mile radius of the smelter stacks located at Copper Cliff, Coniston, and Falconbridge; visits were also made to farms located outside the area of potential sulfur fume injury.

The cultivated area of the District of Sudbury contains approximately 78,400 acres in 2100 farms. Many of these farms are relatively small holdings; many farms are operated on a part-time basis by individuals employed in the mines

and smelters. The major crops grown on farms in the District of Sudbury as listed in Agricultural Statistics for Ontario, 1953, are as follows:

<u>Crop</u>	<u>Acres</u>
Hay	41,800
Oats	18,000
Seeded Pasture	10,200
Potatoes	3,100
Mixed grain	2,000
Barley	1,200
Wheat	950
Buckwheat	450
Rye	300
Corn	250
Field roots	150
	<hr/> 78,400

Soil Conditions

The agricultural soils of the District of Sudbury are water-laid, and range in texture from sandy loams to silt loams. They are predominantly stone-free except for the Precambrian rock outcroppings that occur frequently throughout the entire area. These soils are forest soils in which the organic matter content and, therefore, the nitrogen are low. The internal soil drainage

tends to be poor. Soil samples collected in the Sudbury area ranged from strongly acid (pH 4.4) to moderately alkaline (pH 7.8); acid soils predominate.

The general fertility of the Sudbury area is low for field crops as indicated by chemical soil tests. The fertility levels for phosphorus and potash ranged from low to very low. Exceptions to this were found on farms where good soil management practices have been followed for a number of years. Levels of calcium and magnesium also ranged from low to very low except on alkaline soils. The presence of soluble sulfates was not indicated by chemical soil analysis. (Appendix A and B).

Soil samples taken at seven automatic sulfur dioxide recording stations in 1954 contained less total sulfur than Guelph loam soil in the vicinity of Guelph. (Appendix C).

<u>Location*</u>	<u>Total Sulfur (p.p.m.)</u>
1. Guelph	77
2. Nairn	58
3. Garson	54
4. Grassy Lake	46
5. Bear Island	30

6. Skead	27
7. Penage	6
8. Burwash	5

* Stations 2 to 8 inclusive are located in the District of Sudbury.

Crop Conditions

Soil analyses corroborated the general observations made on July 4th to 8th, 1955, that low crop vigor was due principally to low soil fertility; this condition was aggravated by subnormal rainfall following seeding. The potato crop was an exception to the above general observation in that this crop exhibited good stand and growth, attributable to more liberal fertilization practices.

Sulfur fume injury to some crop plants occurred on July 1st and 2nd in two areas to the leeward of the smelter stacks. Observations made several days later showed gradations in susceptibility among different field crops, which in order of decreasing damage were as follows: buckwheat, alfalfa, barley, oats, alsike, red clover and potatoes.

Buckwheat - This crop which is of limited acreage in the Sudbury district is extremely sensitive

to sulfur fume injury. Because it occurs frequently as a volunteer plant in grain crops, it serves as a good indicator of a sulfur fumigation. Observed injury to buckwheat was confined to the leaf blades where discrete, chlorotic, intercostal blotches of varying area and irregular outline were apparent. The maximum observed injury on any leaf affected approximately 30 percent. of the leaf area. Buckwheat was the only crop which exhibited sulfur fume injury observed on two visitations to the Burwash Industrial Farm located approximately 25 miles from the smelters. On July 5th, injury was observed on young plants immediately following fumigation; this injury was still apparent one month later on the older leaves and no new injury was present.

Barley - Whether this crop is grown alone or with oats, it was very susceptible to sulfur fume injury. Generally less than the apical half of the upper leaf blades exhibited a characteristic bleaching following a toxic sulfur fumigation. Although bleaching of the awns was occasionally observed, no injury was seen on leaf sheaths, culms, or glumes. A maximum of 50 percent. leaf blade injury was noted on the flag leaf of

some barley plants; less injury occurred on the middle leaves and the two lower leaves of a plant were rarely damaged.

Oats - In mixed stands of oats and barley it was apparent that oats were always less severely damaged by sulfur fumes than barley. Injury to oats observed in the first week of July was confined to bleaching of the upper leaf blades; no further injury was observed on farms visited at time of harvest in early August. Injury was most evident on the flag leaf from the tip of the blade and over the arc of the blade formed by the natural bending of the blade; the lower third of the flag leaf blade, the leaf sheath and the enclosed panicle showed no bleaching. Bleaching of the glumes of partially exposed panicles was not observed. The severity of bleaching of the upper leaves varied from intercostal spotting and streaking to a maximum severity involving at least one-half of the leaf blade. Occasionally marginal bleaching extended slightly beyond the apical half of the leaf.

Clovers and Alfalfa - Pasture legumes injured by sulfur fumes showed marginal chlorosis particularly of seedling leaves or young leaves of maturing plants.

Injury caused by the fumigation in early July was still apparent a month later ; trifoliate leaves which developed after this initial injury were normal. Maximum injury involved less than 5 percent. of the area of any leaflet. Alfalfa showed slightly more injury than either alsike or red clover; the leaflets of vetch showed a marginal burning and drying as the result of sulfur fume injury.

Potato - Only slight intercostal bleaching in irregularly delimited blotches, particularly of upper leaflets, was observed in both July and August at widely isolated spots within several fields examined. There was a tendency for chlorotic areas to become dry and fall out. Less than 1 percent. of the leaf areas was damaged by fumes on a few of the most severely injured plants located after careful inspection of several fields. Injury caused by early blight and by hopper burn was considerably more severe than sulfur fume injury.

Other Grasses - Although slight damage to timothy seedlings 2 inches to 3 inches high was apparent on a farm in Capreol Township, injury to such other grasses as Corn, Wheat, Kentucky Blue Grass, Canada Blue Grass, Red Top and Calamagrostis canadensis

was not observed in the Sudbury area.

The incidence of fungus and bacterial diseases was very low on field crops examined in the District of Sudbury. In general, lack of rainfall and the high temperature which prevailed during the growing season probably accounted for this low disease incidence. Of note, however, was the presence of Early Blight injury to the foliage of Chippewa potatoes on the farm of P. Rainville, Rayside Township; a disease rating of 4 (6 to 12 percent: Horsfall-Barratt scale) was recorded.

The susceptibility of various herbaceous crop and weedy plants based on general observations made in early July in the Sudbury area is as follows:

<u>Plant</u>	<u>Rank</u>
Fireweed (<i>Epilobium angustifolium</i>)	1 (most susceptible)
Rhubarb	2
Alfalfa	3
Bracken Fern (<i>Pteridium aquilinum</i>)	3 (up to mid-June)
Buckwheat	3
Horseradish	3
Barley	4
Lamb's Quarters (<i>Chenopodium album</i>)	4

Potato	4 (during tuberization)
Alsike	5
Red Clover	6
Vetch	6
Bracken Fern (<i>P. aquilinum</i>)	7 (mid-June to August)
Oats	7
Blueberry	8
Carrot	8
Potato	9 (during tuber enlargement)

Birch (*Betula papyifera*) appeared to be the most susceptible tree while Trembling Aspen (*Populus tremuloides*) and White Pine (*Pinus strobus*) were somewhat less susceptible. Cucumber, tomato, beets, and cabbage exhibited no injury in a garden which showed moderate sulfur fume injury on rhubarb, horseradish and carrots (A. Paquette. Lot 12, Conc.1, Garson Township, July 6th). Casual observation of the following woody and herbaceous plants disclosed no apparent sulfur fume injury. Twitch Grass (*Agropyron repens*), Willow (*Salix* sp.), Labrador Tea (*Ledum groenlandicum*), *Kalmia* *polifolia*, *Cornus canadensis*, Pin Cherry (*Prunus pennsylvanica*), Horsetail (*Equisetum* sp.), *Cyperus* sp., White Spruce (*Picea glauca*) Black Spruce (*Picea Mariana*), Canada Thistle (*Cirsium arvense*),

Ox-eye Daisy (*Chrysanthemum leucanthemum*), and Wild Barley (*Hordeum jubatum*).

Representative specimens of crop plants and weedy plants with sulfur fume injury, usually of maximum severity observed in a particular area, were collected, pressed and mounted. These specimens are filed in the Herbarium, Department of Botany, O.A.C.

Discussion

In evaluating the gross aspects of recent sulfur fume injury, particularly in oats and barley, the eye tends to see the obvious bleached tissue of the arched upper leaf blades. According to the Weber-Fechner law, visual acuity depends on the logarithm of the intensity of the stimulus. However, this is largely offset since the unaffected lower leaves are not apparent beneath the bleached overlay of the injured upper leaves. This results in an estimate of injury greatly in excess of that actually observed. A more accurate estimate of sulfur fume injury may be made by an examination of individual plants collected at random along suitable transects in a damaged field. Such a method, when sufficiently replicated, permits a more precise evaluation when injury to a leaf

series is considered from the top to bottom of individual plants.

Most farmers in the District are familiar with the symptoms of sulfur fume damage if observed on crops immediately following a toxic fumigation. However, on any crops which are not regularly and carefully examined during the season, most farmers are not able to differentiate among sulfur fume injury, plant senescence, drought, disease, insects, and soil deficiencies. This has led to the belief that sulfur fumes are the source of low yields in the Sudbury area, a situation which is not easily remedied.

The leaf-area of a plant is generally in excess, and a considerable portion of the leaf area may be destroyed before there is a significant reduction in yield. It is considered that sulfur fume injury is localized and that there is no internal affect on the undamaged portions of the plant subsequent to fumigation. This would indicate that the relatively low amount of sulfur fume injury to fields observed in this survey would result in very minor yield reductions in 1955. This does not rule out the possibility of large reductions in yield in a season in which

atmospheric conditions resulted in repeated fumigations by high concentrations of sulfur fumes.

The effect of the quality of pasture crops by sulfur fume injury is considered to be negligible from a nutrient point of view on the basis of published reports.

Summary

1. The cultivated soils of the District of Sudbury were found to be generally acid, poorly drained, and low in fertility. This condition was reflected in relatively poor crop vigor except in the potato crop which is more heavily fertilized and which is grown on the better drained portions of the farms visited.

2. Sulfur fume injury was apparent within a 25-mile radius of the smelters; in this area crop plants differed in degree of apparent injury. The uppermost, younger leaves were more severely damaged than older leaves; damage to leaves of sufficient severity to prevent continued growth of a plant was not observed in the survey. The most severely affected plants had less than 20 percent. of the leaf surface injured, while the average injury in any sulfur-fume affected field was less than 5 percent. Sulfur fume injury was a minor factor

affecting field crop yields in the Sudbury area up to August 8th, 1955.

3. A low incidence of disease and insect injury on all field crops was recorded in the survey.

4. Soluble sulfates were not indicated by analysis of soils sampled in the Sudbury area. The total sulfur content of soils in the area(1954) was lower than the total sulfur content of soils in the vicinity of Guelph.

APPENDIX "F"

SMOKE CONTROL LEGISLATION IN ONTARIO

THE MUNICIPAL ACT, R.S.O. 1950, c.243

388.-(1) By-laws may be passed by the councils of local municipalities:

70. For requiring the owner, lessee, tenant, manager or occupant of any premises in, or of a steam boiler in connection with which a fire is burning and every person who operates, uses or causes or permits to be used any furnace or fire, to prevent the emission to the atmosphere from such fire of opaque or dense smoke for a period of more than six minutes in any one hour, or at any other point than the opening to the atmosphere of the flue, stack or chimney.

(a) This paragraph shall not apply to a furnace or fire used in connection with the reduction, refining or smelting of ores or minerals or the manufacture of cement, brick or tiles or to dwelling houses except apartment houses.

(b) No person shall incur a penalty for an infraction of the by-law until ninety days after notice from the corporation of the existence of the by-law and such notice may be given by publication in

The Ontario Gazette for four successive weeks and by publication within the meaning of section 1 once a week for four successive weeks.

1951, c.53, s.16(4).

399.-(1) By-laws may be passed by the councils of local municipalities applicable to the municipality or one or more defined areas thereof:

1. For regulating the erection, construction, reconstruction, installation, alteration, repair, maintenance, operation and use of furnaces, incinerators, refuse-burning equipment, outside open fires, boilers, chimneys, flues, smoke stacks and other apparatus, devices, mechanisms or structures used in or in connection with the process of burning fuel or other combustible material; and for requiring that plans and specifications therefor shall be filed with and approved by a designated official of the municipality and that without such approval no such erection, construction, reconstruction, installation, alteration or repair shall be commenced; and for requiring that the work so approved shall be commenced and proceeded with within one year from the date of such approval

and that otherwise such approval shall be void; and for inspecting the work when completed and for issuing a certificate that the work complies with the plans and specifications filed and with the by-law; and for providing that without such certificate no such apparatus, device, mechanism or structure shall be operated or used; and for charging fees for such approval of plans and specifications and for such certificates.

- (a) A by-law passed pursuant to this paragraph shall not require the submission of plans and specifications, the issue of permits or certificates or the charging of fees in the case of routine maintenance work or minor alterations or repairs which do not change the capacity of the fuel-burning equipment or the method of combustion or do not adversely affect the production, emission or discharge of smoke, dust, fly-ash, soot, fumes or other solid or gaseous product of combustion.

2. For prohibiting, except to such extent as the by-law may provide, or regulating the

emission or discharge to the atmosphere of smoke, dust, fly-ash, soot, fumes or other solid or gaseous product of combustion from the apparatus, devices, mechanisms or structures referred to in paragraph 1, and for defining the words 'smoke', 'dust', 'fly-ash', 'soot' and 'fumes'.

3. For appointing officers to administer and enforce any by-law passed under this section; and for authorizing such officers to enter at all reasonable times upon any property in order to ascertain whether or not the by-law is being complied with, and to require the owner, occupant, manager or agent thereof to make such tests of or alterations in the apparatus, devices, mechanisms or structures referred to in paragraph 1, or in the manner of operating the same as may, in the opinion of the officer, be necessary to prevent or lessen the emission or discharge to the atmosphere of the products of combustion referred to in paragraph 2.

4. For authorizing the officer of the municipality charged with the enforcement of any by-law or resolution passed pursuant to this section, to permit deviations or exemptions

from the requirements of the by-law or resolution.

5. For requiring persons engaged in selling or leasing for installation in the municipality any apparatus, devices, mechanisms or structures referred to in paragraph 1 to report within 10 days after every such sale or lease particulars thereof to an officer designated in the by-law.

6. For establishing a board composed of not more than seven members, a majority of whom shall not be members of the council, to hear and determine appeals from the decisions and orders of the officers referred to in paragraph 3; and for prescribing the qualifications, manner of appointment and term of office of members of the board, the number constituting a quorum and the procedure on appeals.

(a) Any person may appeal from a decision of the board established under this paragraph to the Municipal Board whose decision shall be final.

7. For providing that, where any prior existing chimney or stack is so located that the emissions or discharges therefrom are a nuisance to the occupants of any building or

structure subsequently erected or where any building or structure subsequently erected adversely affects the draft of any such chimney or stack, such nuisance shall be abated or the adverse effect upon such draft shall be corrected, as the case may be, either by increasing the height of the chimney or stack, or by making such other provision as may be deemed effective by a designated officer of the municipality; and for providing that the work shall be done by the owner of the building or structure of which the chimney or stack forms part and that the cost and expenses incurred thereby may be recovered by him from the owner of the building or structure subsequently erected, in any court of competent jurisdiction, as a debt due and payable.

8. For delegating to the board established under paragraph 6 such of the powers of regulation contained in paragraph 1 as the by-law may provide, which delegated powers shall be exercised by the board by resolution; and for providing that any resolution made by the board may be altered or revoked by such board.

9. For imposing penalties not exceeding (exclusive of costs) \$50 for the first offence,

\$100 for the second offence and \$200 for the third and each subsequent offence, upon every person who contravenes any by-law passed under this section, any decision or order of an officer referred to in paragraph 3, or any decision or resolution of the board established pursuant to paragraph 6.

(2) A copy of a decision or resolution of the board established under paragraph 6 of subsection 1 purporting to be certified by the chairman of the board as a true copy shall be received in evidence in all courts without proof of signature.

(3) Where any by-law, decision, order or resolution referred to in this section is contravened, in addition to any penalty imposed, such contravention may be restrained by action at the instance of the municipality.

(4) Subject to subsections 5 to 9, no by-law passed under this section shall apply to any apparatus, device, mechanism or structure referred to in paragraph 1 of subsection 1 on premises which, on the day of the passing of the by-law, are used for the reduction, refining or smelting of ores or minerals or the

manufacturing of cement, brick or tiles or as dwelling houses, except apartment houses, so long as the premises continue to be used for such purposes. 1954. c.56, s.23.

(5) The council may serve by prepaid registered mail upon any person exempt by subsection 4 from the provisions of a by-law passed under this section a notice of intention to make such person subject to the provisions of such a bylaw upon such terms and conditions as are set out in the notice.

(6) Unless within 30 days of the mailing of such notice the person affected by the notice files with the clerk of the municipality a statement of objections, such person shall be subject to any such by-law to the extent set out in the notice.

(7) Upon service of a statement of objections upon the clerk of the municipality within the said 30 days, the council shall itself or by committee or by the board referred to in paragraph 6 of subsection 1 hold a hearing and shall serve a copy of the decision reached upon the person affected and unless that person appeals in accordance with subsection 8, he

shall be subject to the by-law to the extent set out in such decision.

(8) Within 30 days of the service of a decision under subsection 7, the person affected may serve notice of appeal to the Municipal Board on the clerk of the municipality and the secretary of the Board, and the Board shall hear the appeal and may dismiss the appeal or make an order that the person affected shall not be subject to the by-law or shall be subject to the by-law to the extent set out in the order.

(9) The hearing of the appeal shall be a hearing de novo, and the order of the Board shall be final and binding upon the person affected and the municipality.

THE MUNICIPALITY OF METROPOLITAN TORONTO AMENDMENT ACT, 1955.

24. Section 214 of The Municipality of Metropolitan Toronto Act, 1953 is amended by adding thereto the following subsections:

(6) Section 399 of The Municipal Act shall apply mutatis mutandis to the Metropolitan Corporation and where a by-law is passed by the Metropolitan Council under the said section applicable to an area municipality, any by-law passed by the council of such area municipality

under paragraph 70 of subsection 1 of section 388, or under section 399 of The Municipal Act, or any predecessor of such paragraph or section shall have no effect while the by-law passed by the Metropolitan Council is in effect in such area municipality.



ONTARIO

P R O C E E D I N G S

of the

SELECT COMMITTEE, APPOINTED BY THE ONTARIO
LEGISLATURE, TO ENQUIRE INTO CERTAIN MATTERS
AND LEGISLATION REGARDING SMOKE CONTROL AND
AIR POLLUTION, IN ONTARIO.

Mr. A. H. Cowling, Chairman,
Presiding.

Dr. Frederick Evis, Secretary.

Volume IV

Wednesday, September 21st, 1955,

Toronto, Ontario.

R.C.Sturgeon,
Official Reporter,
Parliament Buildings,
Toronto, Ontario.

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APPENDIX

Report by Mr. Newbury	A-1 et seq.
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F O U R T H D A Y

Toronto, Ontario,
Wednesday, September 21st, 1955,
10:00 o'clock, a.m.

- - - - -

The further proceedings of this Committee
reconvened pursuant to adjournment.

Mr. A. H. Cowling, Chairman,
Presiding.

PRESENT:

Messrs. Brandon, Q.C.,
Murdoch,
Morningstar,
Elliott,
Macaulay,
Gordon,
Thomas (Oshawa)

Hon. Mr. Kelly,

Dr. Frederick Evis, (Secretary).

APPEARANCES:

Mr. B. C. Newbury

Ontario Research
Foundation.

- - - - -

THE CHAIRMAN: Gentlemen, let us come to order. This morning we have with us Mr. B. C. Newbury, from the Ontario Research Council. I will ask him to now come forward.

B E R T R A M C H A R L E S N E W B U R Y ,

Department of Chemistry, Ontario Research Foundation, Toronto, Ontario, appearing before the Committee, but not being sworn, deposes and says:

DOCTOR EVIS (Secretary): In our meeting in April, the Committee mentioned Mr. Newbury's report, and asked for it, and I thought it would be a very good idea if we had Mr. Newbury here to speak in person, and he is here this morning.

BY THE CHAIRMAN:

Q. What is your official capacity with the Ontario Research Council?

A. Let us get this straight, Mr. Chairman. You will hear the words "Ontario Research" quite a bit this morning.

There are two bodies, the Research Council of Ontario, which was a body set up by the government by legislation --

BY MR. MACAULAY:

Q. What government?

A. The Ontario Government. I believe it was set up -- although it was before my time -- as the result of a committee enquiring into the needs for research.

BY MR. MORNINGSTAR:

Q. What year?

BY MR. MACAULAY:

Q. For general research or what kind of research?

A. Just the general needs for research in Ontario.

Q. That is the Research Council of Ontario? Is that right?

A. Yes. The Ontario Research Council, which I believe is now defunct.

BY MR. ELLIOTT:

Q. You have no connection with the University?

A. No, I have no connection with the University. I am not a member of the Research Council. I am a member of the Research Foundation.

I wanted to get these things clear in your minds.

After the war, the government set up a Committee to look into the needs for research, and as a result of that enquiry, the Research Council of Ontario was set up to promote and administer the funds for research.

At the same time, there existed in Ontario the Research Foundation, which was formed jointly by government and industry, each contributing a sum of money to form the Foundation.

The Research Foundation is a non-profit organization, completely divorced from the government, the university, or anybody else. It works entirely on its earnings, and what it receives from the original Foundation.

Q. What Department of Government do you come under?

A. We do not come under any Department of Government at all.

Q. Where do you get your funds?

A. The original funds of \$1 million, plus what we earn.

Q. You earn some money?

A. Yes. We charge for our services, at cost.

MR. ELLIOTT: I think that is very important.

THE WITNESS: It was dissolved about six months ago, I believe. I wanted to make clear the difference between the Research Council and the Research Foundation.

BY THE CHAIRMAN:

Q. And you are the --

A. Research Foundation, which is a scientific

research body, and we did work for the Research Council. We received government funds for our work.

Q. You secured money from the Ontario Government?

A. Yes, we received money from the Ontario Government, through the provisions of the Research Council.

THE CHAIRMAN: Are there any questions on that point, gentlemen?

BY MR. MACAULAY:

Q. Your funds -- not that it has anything to do with this, but it is interesting to know -- come not directly from the Ontario Government, but from the Research Council of Ontario?

A. They did come from the Research Council. The position was changed six months ago. The Council was dissolved, and as far as I can tell, we are in rather an interim hiatus at the moment, but still receiving funds.

Q. They come directly from the Government?

A. I presume so. I am on the technical staff, and I am not too familiar with the financial set-up of the Foundation.

MR. ELLIOTT: It must be from the Treasury Department.

MR. MACAULAY: No. I think it is a grant.

They are not administered by the Government, but the Government felt they should give the Foundation some money every year.

MR. THOMAS (Oshawa): The Research Council is dissolved?

THE WITNESS: Yes.

BY MR. ELLIOTT:

Q. Where is your Head Office?

A. Two blocks north on Queen's Park, just north of St. Joseph's College.

BY THE CHAIRMAN:

Q. Now that everybody knows who you are, and where you are from, go ahead.

A. One of the "attributes" -- shall I call it -- of the Research Council was that it could recommend to the Government that where a problem in research needed attention and where a number of firms were prepared to contribute, thus creating what we call a "group research", the Research Council could recommend to the Ontario Government that the Government defray up to one half of the cost of that research.

In 1952, the Industrial Wage Subcommittee,-- which was one of a number of subcommittees set up by the Research Council to enquire into research problems in various fields-- went into the subject of industrial

waste, and decided that a laboratory was necessary for the study of air pollution, in order that the general public might have somewhere to go for tests and advice, and do the research into air pollution problems.

As a result of that, they asked the Research Foundation if they would set up the maintenance of that laboratory.

At that time, air-pollution equipment -- the instruments needed for air pollution -- were virtually unobtainable in Ontario. There were one or two in Sudbury and one or two in Windsor, but they were fully occupied, and there was nowhere else where we could borrow them, and to purchase them we had delivery dates eighteen months ahead and more, quoted to us. So had an acute problem arisen, we would have been unable to get any specialized equipment to tackle the problem, and for that reason the Research Council recommended to the Government that it put forward funds to set up the laboratory, to enable us to gather together a stock of equipment which would be immediately available for air pollution problems.

BY MR. MACAULAY:

Q. When was that?

A. Early in 1952.

Q. How much money was involved?

A. I believe the first year we had \$25,000.

Q. Would you mind when you are referring to the "Government" -- is it the provincial government?

A. Yes, the provincial government. We had no contact with the Federal government from a financial point of view, in any way.

At the same time, the Industrial Waste Subcommittee approached the three major industrial concerns in Sarnia. They were the Imperial Oil, the Polymar Corporation and the Dow Chemical Company, and suggested that the rate of industrial growth in Sarnia was such that air pollution might well become a problem in a short time, and it might be well for these three industries to work together in Sarnia to find out what was causing air pollution, and what could be done about it.

Those three Companies agreed, so the Research Council of Ontario put forward a scheme under the group-research arrangement, and an agreement was made whereby these three Companies contributed 50 percent. of the cost of the investigation, and the Government contributed the other 50 percent.

Q. What were those three Companies again?

A. The Imperial Oil, the Polymar Corporation and Dow Chemical.

Q. All at Sarnia?

A. Yes.

BY MR. ELLIOTT:

Q. The Dow Chemical and the Polymar Corporation use the products of the Imperial Oil so they are really all Imperial Oil?

A. No. They all use each other's products.

Q. They are all scratching each other's backs?

A. Yes. The Research Foundation was asked to undertake, through the air pollution laboratory, the technical studies, and that is where I entered the picture.

Q. And you say this was in 1952?

A. This was 1952. We started our survey in Sarnia in 1952.

Q. May I also ask you, if you have completed your survey at the present time?

A. No.

Q. You are still working on it?

A. Yes.

Q. So it has been going on for three years?

A. Yes.

Q. In that one localized area?

A. Yes.

Q. Proving, I suppose, it is a big problem?

A. It is a big problem, yes.

This scheme required the Foundation to set up weather stations and sampling stations in the residential districts of Sarnia. It was not considered that group funds should be used for the investigation of problems within the boundaries of private premises, and each firm undertook to do its own sampling and investigating in its own area.

Shortly after that started, three other members joined the group, so we had six industries co-operating.

Q. What were the other ones?

A. The Cabot Carbon.

Q. What do they do?

A. They make carbon black.

Q. What is that for?

A. It is used for printers' ink mainly.

Then there was the Sun Oil, and the Canadian Oil. So there were three oil refineries.

Q. Three of them, roughly, were chemical companies, one was a rubber company, and the carbon black. They are all petrol-chemical companies.

A. The function of the laboratory was to discover the constituents of and the concentration of pollution in the air, and to advise the company on

methods of suppression, and although we have had, from time to time, unofficial complaints, not only from Sarnia, but from Port Huron, no official complaint was ever made to Washington, and the International Joint Commission has not been asked to come along and take any interest in that problem.

Q. Do you consider that is possible because of the prevailing winds?

A. I do not quite "get" your point.

Q. How far is Port Huron from Sarnia?

A. The width of the river, which is maybe 800 yards. It is the same as Windsor and Detroit.

BY MR. THOMAS (Oshawa):

Q. That would be a problem mainly with water pollution down there?

A. No, we do not deal with water pollution. I do not think you would get much.

BY MR. MACAULAY:

Q. What is the prevailing direction of the winds?

A. Almost due west.

Q. That is the point I am making. If the wind prevails from the west and south, it is likely that any pollution from Sarnia would go in a westerly direction, which might account for the fact that it would not be enough in the United States to cause any

complaint.

A. That is true. We have had only one or two complaints, to which I shall refer later.

BY MR. ELLIOTT:

Q. The International Joint Commission, of which Mr. Murdoch was speaking, has been working with you?

A. No. We did go to Ottawa about a year ago, when we had an unofficial complaint, and the International Joint Commission wanted to know what was going on in the area.

We went to Ottawa, and we explained our work to the Commission, and they were satisfied we were looking into the problem. They now receive copies of our reports.

BY MR. MACAULAY:

Q. They left it with you, and at the moment they are not taking any action?

A. There is no official Ottawa-Washington interest in it.

Q. The complaints do not come through the government at Ottawa?

A. They are made directly to the Mayor of Sarnia, or possibly an outburst in the local press, which we watch carefully

Q. And there is a lot of it?

A. No, I would not say there is a "lot". We have odd times when, under certain conditions, we get a batch of complaints, and then we will go for as long as six months with no complaints whatsoever.

We are using the same techniques in Sarnia as we used in the Windsor-Detroit survey, and are thus able to make direct comparisons.

I would like to stress that point, because air pollution is a new study, and people are making up their own apparatus, and there is very little standardization, and, in general, unless you know exactly the conditions under which samples are taken, it is not practicable to compare the results in one city with those in another.

Q. Where is your control operated?

A. We do not have any controls.

Q. How can you compare pollution in one area with another, when there is no pollution?

A. We are not tackling the problem exactly on those lines. Where we need a reference area, we are using the Detroit reference, and Harrow and Simcoe.

Q. Surely, everything is comparative in regard to air pollution?

A. We are taking the attitude all through that pollution comes in and out of an area, and we are taking

the difference between the dirt, say, on the north boundary and the south boundary of Sarnia, or as it comes from the south boundary, and passes over the industrial area to the residential area, and we are comparing the residential area with the south boundary, and with the industrial area.

BY MR. ELLIOTT:

Q. Do they burn coal?

A. The major steam plant is a coal-burning plant, and it does contribute to the pollution in the air.

Q. There is no oil burned in your companies' steam plants at all?

A. No, I do not think so, except perhaps the incinerator to get rid of a few odd drops of oil which they do not need.

The prevailing wind in Sarnia -- as in most of Ontario -- is southwest, and for those of you who do not know the area, may I say that industry is strung out along the river bank, that is, in a general southwesterly direction, and, unfortunately, the prevailing wind goes progressively over the industrial area and ends up over the residential area. That is a good sample of bad town planning, in that respect.

We first of all set up a master recording

station in the residential area. We tried to put it on a line from southwest to northeast, through the main industrial area, and sited it as close to the industrial area as we could, putting it in amongst the first few houses in the residential area. We could not find an open space which was free of local influences exactly on the line, and a final location was selected in Tecumseh Park, which is about a quarter of a mile off the southwest-northeast axis with which we started.

This station includes a Thomas Autometer for recording automatically the concentration of sulphur dioxide in the atmosphere, and a Bendix-Frieze anemometer, which gives wind velocity, direction and turbulence, as well as Hemeon and High-Volume samplers, and a dust can.

, BY MR. MACAULAY:

Q. What is that Bendix -- what do you call it?

A. A Bendix-Frieze anemometer. It gives the wind velocity, direction and turbulence. It is different from the normal meteorological anemometer, in that it has a very light recording head which takes up every fluctuation in the wind, and from these fluctuations we can also get the measure of turbulence, or the tendency of the air to mix. That is data which

is badly required, because it is one character of the air which causes pollution and dispersion.

Of course, we have two air samplers, one is a high-volume sampler which collects a very large volume of air, something to the order of 3,000 cubic meters per day, and enables us to get a sample sometimes as large as several grammes of the dust sustained in the air.

We then carry out chemical analyses to identify the constituents of the dust.

We also have the low-volume sampler which draws small amounts of air through a clean filter paper, and deposits a stain on it, which is a measure -- not a technical measure -- but a measure of the haziness of the atmosphere.

These two samplers both measure the same thing. They measure the dust in the air, but in two different ways.

BY MR. ELLIOTT:

Q. You can only measure solids. If there is any liquid, you cannot measure it.

A. In the analyses we may find things we know are liquid.

Q. But you only pick up the solids?

A. No, the liquids are dropped on the filter paper.

We then measure them separately.

Q. Have you any way of making an analysis of liquids, from which you can tell what they are?

A. No; it is not possible to collect the liquids without collecting the solids.

BY MR. MACAULAY:

Q. You are able to test and see what liquids are in the air?

A. Yes.

Q. But you do not know the quantity?

A. No, not by the deposits on the filter paper.

That is the equipment which we have set up in the main station, and we try to keep that running continuously, so we have at least one reference point within the city.

To avoid having to put a number of these stations over the city, we developed a mobile laboratory which can be moved around the city, and that has enabled us to take readings at a large number of places, for a relatively small capital outlay.

BY THE CHAIRMAN:

Q. Would you loan that machine out? Professor Allcut has been trying to get a mobile laboratory from the city of Toronto. Would you permit yours to be used by other organizations?

A. If we were not using them at the moment. We have two. One is in Sarnia, and another is going to Hamilton, and we are buying a second one for Hamilton.

Q. What are they worth?

A. The unit costs about \$3,000. by the time you get it on the road, plus the equipment which goes into it, and plus a vehicle to tow it.

Q. It has to be towed?

A. Yes. It is a trailer.

Q. But if at all possible, you would make that available for studies other than your own?

A. Oh yes, indeed.

BY MR. ELLIOTT:

Q. Is it not true that Hamilton has one on its own?

A. I do not know what the city of Hamilton has been doing.

BY MR. MURDOCH:

Q. Have you been approached by the city of Toronto or the Metropolitan Council to do any work in this area?

A. No, we have had no approach from them, whatsoever.

Q. That is, the only way in which you would start work in an area, would be on request?

A. Yes.

THE CHAIRMAN: I think it would be of great use in the city of Toronto.

BY MR. MACAULAY:

Q. You consider, Mr. Newbury, from having one of these mobile units, that they are a necessary adjunct to a thorough investigation of the pollution in the air in large industrial areas, such as Toronto?

A. Oh, definitely.

The way we tackled this was that we started with the dust fall, and we have a large number of cans which collect the dust which falls in the atmosphere. That is the easiest one to collect.

The next is black smoke, the finely divided dust which floats around in the air, but that is not the whole thing, by any means.

The next is the sulphur dioxide which is a by-product of almost all combustion processes.

Q. Is that poisonous?

A. Yes, but not in the quantity normally found in the atmosphere. I would like to come back again to the question of toxicity later on.

Sulphur dioxide is forced in and then goes two or three ways, but provides nothing you can detect. It is necessary to have continuous recorders recording

twenty-four hours a day with the sensitivity of one part per million.

BY MR. MACAULAY:

Q. During the smog days, sir?

A. Yes.

Q. And that is caused by clouds collecting overhead, so it cannot escape, and it will stay there, with the clouds forming a lid on it?

A. Clouds can form a lid, but it can happen without clouds.

Q. The upper layer of air will just hold it?

A. Yes.

BY THE CHAIRMAN:

Q. You do not mind if we interrupt you as you go along?

A. No, indeed.

Q. Recently, there has been considerable talk about the atomic tests from explosions in Nevada and some people think it is possible that radioactive dust can come as far as Toronto and affect the people of Toronto.

Is the mobile unit, to which you have referred, accurate enough to pick up any atomic dust which might be in the air in Ontario?

A. The unit itself is no more than a moving

laboratory.

Q. When you collect the material, can you tell whether some of it is atomic dust?

A. Yes.

Q. How?

A. With a Geiger counter. The high sampler we had them develop was developed through the work with the A.A.C. precisely for that job.

Q. Did you get any of this information?

A. We have a Geiger counter and we thought the government would look after that. We are being paid to find out what local industries are doing, and we have not interested ourselves too much in the other aspect.

Q. But you could, if you had the equipment to do it?

A. Apart from the Geiger counter to determine radioactivities, yes.

To go back to the mobile unit: the capital cost is about \$3,500, and if you want to cover a large area of many square miles, you need a large number of instruments which you can move around.

Windsor started off with nine fixed stations, and they decided that nine points in the city of Windsor were not enough coverage. They already had

nine \$3,000-instruments, and we can take them anywhere we like.

BY MR. MACAULAY:

Q. In Windsor, they have about twenty-seven thousand dollars worth of mobile units?

A. Yes.

Q. While in Toronto, they have four or five pieces of cardboard with holes in them, through which you can look.

THE CHAIRMAN: I do not think it is altogether as bad as that. I think it is much better. Actually, there has been a considerable amount of money spent by the Council.

MR. MACAULAY: Yes, all in salaries. I think about \$60. was spent for equipment, most of it for pieces of cardboard. In speaking to Mr. Neilson he said they had \$60. worth of equipment.

MR. MONRINGSTAR: Is this in the city of Toronto?

THE CHAIRMAN: In a small foggy section of the city.

MR. MURDOCH: I think it could be said, in all fairness, that no doubt the municipalities in the Metropolitan Area have given this the "go by", but perhaps after a year or two of thinking about it, the

Metropolitan Council will tackle the problem, but they have not yet, of course.

BY THE CHAIRMAN:

Q. Will you proceed?

A. At this point, Mr. Chairman, I would like to pay tribute to the Meteorological Office of the Department of Transport, who have given us a great deal of assistance in meteorological matters, and also to pay tribute to the Hydro Electric Power Commission of Ontario, who have mounted cross-arms on the hydro poles, complete with drop leads, so we can, by arrangement with them, take small pieces of equipment out and stand them on the cross-arms, and plug them into the hydro supply, and take readings all over the city. With a few days' notice, every hydro pole in Sarnia can be a sampling station for us. That has helped us considerably, and it is even better than the mobile units.

During the last three years, we have been collecting this data, and at the present time we have obtained the three-year average, which we feel is a fairly reliable basis for the datum line-up, by which, in the future, we can compare the growth or decrease of pollution in the city of Sarnia.

Pollution depends quite a bit on weather, so that in a three-year period, in spite of no increase

in pollution, we measured pollution in the atmosphere, and found it had been increased, so the weather has been dispersing the pollution more than sufficiently to overcome the increase.

We feel that one year's reading does not provide a reliable estimate, but three years is quite fairly reliable in regard to the pollution level.

BY MR. MACAULAY:

Q. Why would you say that one year was not reliable?

A. Because the pollution in any one point can vary by different factors up to about 200. If we took a sample outside this window this morning, and took one tomorrow, tomorrow's level may be 200 times as great as the one this morning, depending on the meteorological conditions.

Q. Over the years --

A. We can divide the year into four seasons, each of which has its own characteristics, and then we are back to the four three-months' average. Those are not sufficiently stable to give you a reliable reading.

Q. So to do a thorough study, from the city's point of view, your studies would have to continue over a three-year period?

A. Yes.

Q. Little samples here and there are not sufficient?

A. No.

BY MR. ELLIOTT:

Q. Is there any more pollution in the winter time than in the summer?

A. I will bring that up a little later.

Doctor Katz, who is in charge of the Windsor survey, suggested the dust fall could be divided into a number of arbitrary classes or zones, and the worst area in Sarnia is the industrial area, which is classified as a "medium heavy pollution". In Windsor, they had one one class higher.

BY MR. MACAULAY:

Q. What is theirs?

A. They start at "heavy", whereas in Sarnia it is classified as "medium heavy".

BY MR. ELLIOTT:

Q. Can you measure gases in the air?

A. Yes.

Q. As well as solids?

A. Yes. The residential area is classified as "low", with the exception of a small area around the docks, and the waterfront, which is "medium".

Speaking of the effect of the seasons; most seasons have a high reading in the winter and low in the summer, and this is usually considered to reflect the influence of the heating load, and it was generally thought that affects the heating during the winter.

But in Detroit, Cleveland, Windsor and now in Sarnia, we find a typical graph which is level during the winter, and at the same level during the summer, but peaks up in the spring and again in the autumn.

BY THE CHAIRMAN:

Q. Why?

A. We do not know for certain, but we think the effect is due to the shipping. So you have a heat load all winter, and a shipping load in the summer, and the peak in the spring, where they overlap, and another peak in the autumn where they overlap again.

BY MR. MACAULAY:

Q. How much higher is the peak than the norm? You mean the peak is not the same in each instance?

A. No; usually it creeps up in the winter and down in the summer.

Q. So, as the hon. member for Hamilton (Mr. Elliott) suggested, it is higher in the winter and down in the summer?

A. I do not know about the increase.

Q. Assuming the Great Lakes shipping was not involved, you think the statement by the hon. member for Hamilton is correct?

A. Yes, it is generally correct.

Q. Then how much higher would the peak be, percentage-wise?

A. In Sarnia?

Q. Yes.

A. About 20 percent. We have looked into this question of shipping, as has the International Joint Commission, and some improvement has been effected by improved firing techniques, and the picture now seems to be that a large majority of the ships are obsolete, and are not likely to be replaced until the St. Lawrence Seaway comes into existence, and we feel there is not much more we can do about it.

Q. May I ask you this, although I do not know whether you will want to answer it. But would you conclude, from your own experience, that when the St. Lawrence waterway commences to operate, the shipping companies will change the design of their ships, and use plants which may alleviate, at least, a part of this condition in Sarnia?

A. I would say so, but a large number of the vessels are beyond their normal life, and they are only

being kept in service until the Seaway will allow larger and broader vessels to be brought into commission.

I cannot imagine people using again the type of power now used on some of the old "crates" on the St. Lawrence River.

BY THE CHAIRMAN:

Q. You think there are a great many of the Great Lakes ships which will become obsolete and out of service, as soon as the ocean boats start coming through?

A. Yes.

Q. But they will be held in service, until the ocean boats start to arrive, some four or five years hence?

A. Yes. We have been told by the Maritime people that the cost of converting a large number of ships would be more than the capital value of the ships at the present time, and they are not willing to spend that kind of money.

BY MR. ELLIOTT:

Q. Have they converted any of them to oil?

A. Yes, that can be done, and we think, in general, that is very much better as there is very much less smoke than with coal firing.

BY MR. BRANDON, Q.C.:

Q. Is that your own impression, or an opinion based on advice of some of the ship owners? What was it upon which you base that statement?

A. It is mainly on the advice of the ship owners. I must admit I am not an expert on shipping.

BY MR. MURDOCH:

Q. Mr. Newbury, I might say we are all looking forward to the time when these great clouds of smoke will be eliminated, for instance, on the Detroit River, and ships will be using more Diesel equipment, but if anybody looks at the Detroit River, they will notice there are a number of Diesel boats going by in quick succession, and then you get a bad condition all through the houses, and you get an increased deposit as time goes on.

In other words, I do not think the use of Diesel equipment will make that condition any better. I think we will still have one or two problems.

A. You are highlighting a point I wanted to "get over". I do not know how educated this Committee is on air pollution, but many people think that "air pollution" is just a number. It is much more involved than that.

In Los Angeles, they have smog which they

think is due, in part, to motor exhausts, and I know Detroit is watching it closely, and spending quite a great deal of money on carburation of exhaust gases, and it could be that the pressure from Los Angeles will eventually give relief on the Detroit River.

We believe the change-over to oil cuts out the black smoke, but many people use it and it does not solve the problem.

BY MR. ELLIOTT:

Q. It gives off many gases which are more deadly than smoke?

A. We do not know about that.

Q. You think we are not able to measure it sufficiently?

A. There is nothing to be learned about gases in pollution.

BY MR. THOMAS (Oshawa):

Q. It does not matter what kind of fuel you burn, you get air-borne gases. If you are burning coal, you can see it, but with oil you cannot see it quite the same.

A. If you could burn your coal 100 percent., and catch the carbon dioxide, you might get it, but you never burn your fuel 100 percent. You always get some flue gas which is polluted.

Two of the high-volume runs we carried out

were specifically designed to check and in order to determine what increase, if any, resulted from the operation of the oil company's catalytic cracking unit. The two units in Sarnia we brought into line, did not appreciably add to the pollution. We could find no difference before and after and subsequent analysis of the dust escaping from the catalytic cracker has conformed that the loss is negligible in relation to the amount of aerosols already present in the atmosphere, that is, in relation to the pollution already in the air.

Then we went on and recorded the sulphur dioxide, which is one of the most ubiquitous of the polluted gases.

We also computed hydrogen sulphide, and the highest concentration is one tenth of one part per million, and we were satisfied it was very much below the concentration normal considered necessary to give a physiological reaction and we were not at all interested in them.

More recently we have had complaints from local members, and firms have come to us complaining that their brass parts in their machines are becoming badly discoloured, and it is interfering with their production, so we are once again testing for the

hydrogen sulphide concentration.

BY MR. MACAULAY:

Q. What is the name of the brass company?

A. It is the Muehler Brass Company Limited.

BY THE CHAIRMAN:

Q. Where are they located?

A. They are in this same area, sandwiched in between the Imperial Oil and the river. The Imperial Oil has gone right around it.

BY MR. MACAULAY:

Q. How long have they been established there?

A. Longer than the Imperial Oil.

Q. Then they were not complaining about this condition as they are now? Is that it?

A. There is one complicated factor, and that is that they have recently joined the survey, and it could be that having joined the survey, they feel they might get some advantage out of it. I do not know.

BY MR. MURDOCH:

Q. An engineer in Ontario has been using one of the expensive model cars, which had one of these gold ornaments, instead of the nickel-plated one, and it tarnished almost immediately, and they changed immediately back to nickel.

MR. MACAULAY: What is that?

MR. MURDOCH: That is the new Monarch car.

MR. MACAULAY: Did they change it universally?

MR. MURDOCH: All through the Windsor area.

MR. MACAULAY: Is this one of those new

"Big M's"? Ed Sullivan is advertising the Monarch as the new "Big M". Are you speaking about the 1956 model, or the 1955?

MR. MURDOCH: I would have to consult with my lawyer before I answer that question.

MR. MORNINGSTAR: Why would they change? On account of the air pollution?

MR. MURDOCH: My point is there must be something in the air the engineers did not figure on, which was not in the air when they ran a test on this type of brass ornament. It just tarnishes quickly. It is absolutely washed out, and you would wonder why they put them on in the first place, because it looks horrible to see these ornaments on the cars, all tarnished.

MR. MACAULAY: I thought we were discouraging car ornaments.

THE CHAIRMAN: Let us not get into the Toll Roads Committee.

BY THE CHAIRMAN:

Q. Will you please carry on, Mr. Newbury?

A. The complaints we have received are from Port Huron, and Sarnia as well, but we have not spent so far a great deal of time on them. They come and go. Sometimes it is bad, and sometimes it is not.

As I say, we have concentrated for three years on getting this datum line set down which we think in the future will be the datum for 1952-1955, and will know what Sarnia was like at that time.

We are now taking away our physicist and meteorologist, who was at Sarnia, and replacing him with an organic chemist, trying to trace these chemical compounds which come from the Sarnia area, and cut across to Port Huron.

BY MR. MACAULAY:

Q. That has happened there?

A. Yes.

Q. And it is almost like tear gas?

A. Yes.

Q. It is in my riding, it spreads across one of the baseball parks set up by the city. As I understand it, it is not like a tear gas bomb, but it is most unpleasant. It stings your eyes, and even will sting your skin, and it will certainly make your eyes water.

THE CHAIRMAN: Where does it come from?

MR. MACAULAY: There is a plant immediately to the west of it.

THE CHAIRMAN: That is the Tar and Varnish outfit?

MR. MACAULAY: Something like that. They cut out some of them. I used to go down there with a ball team I had, and it was a most unpleasant thing.

BY MR. MACAULAY:

Q. You are not finished with these complaints, are you? I wanted to ask you about some other things.

A. We get the complaints which come in. One of the troubles is finding out what they are. I will be asked what it is, and we do not know. We have our own ideas, but we have not proven them.

Q. What has been the nature of the complaints? Can you divide them into different categories? I suppose you have complaints where people have had a stinging sensation on their skins? What kind of complaints have you had?

A. That is the most common complaint. We have had very little complaint of black soot or fly ash -- just one or two odd ones.

Usually they have been associated with some upset in the processing conditions; something we could explain.

Q. Have you any brick works in Sarnia?

A. No. There is a cement plant in Port Huron.

One of the problems is getting samples of this material. It appears sometimes only for a second, very seldom for ten minutes or a quarter of an hour at a time, and on numerous occasions men have reported in the plant that they could not work because of the tear gas and by the time the foreman has gone back to see what it is all about, it is clear again.

Most of these lachrymators --

BY THE CHAIRMAN:

Q. What is a "lachrymator"?

A. It is a term for something which brings tears into the eyes; a tear gas, in other words.

BY MR. MACAULAY:

Q. May I just say this, to point out this fact, that apparently it can be mixed very quickly by movement in the air. That is obviously so, because, as you say, you cannot get there in time to test it. But if it was a condition in the smog, it could be quite a serious thing?

A. Yes, I agree it could be. It has not been, so far. We are aware of it, and we cannot rule it out.

Q. You have not had too many complaints about it?

A. On and off we have had the odd complaint, probably going back for two or three years, but the complaints have never been insistent enough, so that we have been forced to do anything about them.

Q. Have they been increasing?

A. We had a period of nine months when there was no complaint, and we have had three in the last month.

Q. You do not mean there were only three people who complained about it?

A. No; there were three occasions when complaints were received.

BY THE CHAIRMAN:

Q. That would be pretty much the same condition as we saw on TV Sunday night, where the people in Los Angeles had their handkerchiefs out, wiping their eyes?

A. Yes, but I do not think the causes were the same.

BY MR. MACAULAY:

Q. But the reaction is the same?

A. Yes.

Now, the next gases which can cause tears -- there are only a limited number of them. I think there were only about four which we could notice in

the Sarnia area, and the form of these gases would be occasioned by a simultaneous line of chlorine, and a line of organic chemicals, from one of the organic mixtures, plus wind direction and wind turbulence, in order to mix these gases together.

Q. They could all come from the same outfit?

A. Not necessarily.

Q. Are they common with anything?

A. No. When it is formed, it intensifies the effluent from one plant, mixing with the effluent from another plant.

BY MR. ELLIOTT:

Q. There is a terrific amount of gasoline stored there, and there is a tremendous leakage from the tank.

A. No, most of that has been taken care of.

The industry in Sarnia has spent about \$4 million, and one of the things they have done is to put floating roofs on the tanks, which float on the top of the gasoline, so there is no air space --

Q. No leakage at all? No vapourization in those big tanks?

A. No leakage at all. Either that, or they are piped back to the recovery plant, which recovers the leakage.

BY MR. MACAULAY:

Q. Could any of those vapours be one which could

cause tear gas, that is, have the ingredients of tear gas?

A. No. The origin of these gases is not known for certain, but it is suspected that reactions are taking place in the atmosphere between chlorine, which is manufactured in one plant, and organic materials, such as styrene, glycols, and possibly cyanogen or hydrocyanic acid, which may be spilled from other plants.

BY MR. ELLIOTT:

Q. These tanks are going up and down; is there not a discharge of vapour from them all the time?

A. No, not if you float the roof on top of the gasoline.

Q. They have to have a fan there to let the air in?

A. No, as they take the gas out, the roof on the tank sinks. It is like a cork bobbing on top of the liquid.

Q. They can keep it tight enough so there is no vapour through the roof?

A. That is right.

This survey has not produced a great deal at this time in tangible results, there are quite a number of intangible things which I think should be mentioned.

We have now ten local firms -- in fact, nearly all the firms in Sarnia -- which are contributing and it is instructive to see the competing firms sitting down and advising one another as to the steps they have taken, and the difficulties they have gotten into, and how they overcame their problems, helping one another to combat this air pollution problem.

BY MR. MACAULAY:

Q. Can you tell me approximately how much this survey is costing per year?

A. Around \$20,000. a year.

Q. So the more companies which come into it, the less the burden on each one?

A. Yes.

BY MR. ELLIOTT:

Q. Do you think it will ever be finished?

A. They may go out, but somebody else will have to go in and carry on these processes of the survey, to keep control all the time. I do not think it will be necessary to continue the survey at its present density forever, but it will be necessary to continue a modified survey, say, one year in five, to check up on it.

Q. Machinery will have to be set up to keep control?

1. The first thing I noticed

was that the weather was absolutely

perfect. It was just what I needed

after a long, hot summer.

I had heard that the weather was

just what I needed.

It was just what I needed.

I had heard that the weather was

just what I needed.

It was just what I needed.

I had heard that the weather was

just what I needed.

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just what I needed.

It was just what I needed.

I had heard that the weather was

just what I needed.

A. Yes, I think so. At the time it started, the Sarnia Council was considering an air-control by-law.

BY MR. MACAULAY:

Q. It would not have to be of such intensity? There could be interim checks to see that the results were being obtained?

A. When we know how much it is, and what it is, then it will be easier to monitor the necessary studies.

BY THE CHAIRMAN:

Q. As a result of your survey, there will be air-pollution by-laws passed? They do not have one now?

A. No. They were considering it, but have temporarily shelved the idea of a smoke by-law.

BY MR. MACAULAY:

Q. In line with what the Chairman has said in regard to the by-laws; what they would prohibit would to a large extent depend upon the results of your survey?

A. Yes.

BY MR. ELLIOTT:

Q. And your recommendations?

A. Yes. In one case, there was a bonfire used for burning discarded oil, rubber and plastics. The industries all got together there to dispose of that material, and that bonfire has been stopped, and now

that it has been stopped, the local Council, I am told, is considering passing a by-law prohibiting bonfires. In other words, as the survey overcomes problems and shows the solution, the local Council is confirming them with by-laws, so that everyone has to conform.

BY MR. ELLIOTT:

Q. All the municipalities would need are inspectors to carry out the provisions of the by-laws?

A. Yes.

BY THE CHAIRMAN:

Q. That might be rather difficult, speaking on that very point.

For instance, we have a by-law which prohibits the burning of leaves on the streets and public thoroughfares. At this time of the year -- and I know, because I live in one of the areas affected -- they burn leaves, but actually it is against the law, but it is a difficult thing to police, when you have a block of 200 or 300 houses, and you may have 75 people out burning leaves, it is a tough job for the police to stop them. That would be more apparent in the next two or three weeks now, and this burning of leaves is making a terrific contribution to air pollution. It is just awful. But the problem is how to police it.

MR. MACAULAY: I understand two things; one, is that in Toronto we have only nine or ten inspectors, and they have only one car amongst them, so by the time they travel on the subway to where the leaves are being burned, it is very often a little late.

THE CHAIRMAN: It is not a job for the inspectors, but for the police.

MR. MACAULAY: We have been told -- I think by Professor Allcut that the police have been asked to help enforce the smoke by-law. I would not go so far as to say there has been no co-operation; there has been a great deal, but Professor Allcut points out that the complaints coming in to the police are negligible --

THE CHAIRMAN: On the other hand, you cannot blame the police, and you cannot really blame the citizens. If you have a big pile of leaves in front of your house, and have to wait three or four days for the garbage collectors to pick them up -- and I am not blaming the garbage collectors in the city -- if you can simply put a match to them and dispose of them in ten minutes, it seems the logical thing to do, and they feel that the land in front of their houses can be used for any reasonable purpose, and they think they are helping the city -- and I think they are, too -- in disposing of this thing that way, but it does create

an air-pollution hazard.

BY MR. ELLIOTT:

Q. I would think it would be a fire hazard.

THE CHAIRMAN: No, they are on top of it all the time, and there is no fire hazard to it.

THE WITNESS: I think that leads into my next remark.

As far as legislation is concerned, we feel that Sarnia is showing the right example. You have to get 80 percent. of the population obeying a law, to make it effective; otherwise, you have a police state and a dictatorship.

THE CHAIRMAN: That is a good point.

MR. MACAULAY: Which bears out the Chairman's position that it is not so much a question of legislation, but good results depend more upon public education.

THE CHAIRMAN: And co-operation.

THE WITNESS: It depends on both co-operation and education.

Beside this work in Sarnia, in the meantime we have been doing a great deal of ad hoc tests for local industries, and local manufacturers, who come to us and say, "Can you check my stack?", and while we do not profess to interpret the law, we try to put our results in a form which will be intelligible

and germane to the by-law.

We had one case where we were taking a check of a stack to see if it agreed with the by-laws, which you all know say that pulverized material must have a collection device of at least an efficiency of 75 percent. and must collect 80 percent. of the dust which comes up the stack. That is a recommendation of the American Society of Mechanical Engineers, and is written into hundreds of by-laws.

We went to this stack and took samples. Then we have the cyclone, which we use to test this material. The first thing we found was that the cyclone was not 80 percent. efficient, and the Council wished to take action against the man for that reason. But, as he pointed out, he was not using pulverized fuel, and had no cyclone. Therefore he was permitted to operate without the cyclone.

The second point was that the .85 pounds of dust per 1000 pounds of flue gas is tied back to the carbon dioxide content of 12.5 percent. That is put in to stop people with boilers putting excess water up their chimneys diluting their flue gases and other dust to below the legal limits.

In this particular instance, they were raising the dolomite which, on heating, gives us

carbon dioxide, so the carbon dioxide of that stack was around 30 percent.

So if you try to apply that law, from my point of view, as a technical man, then you have to divide the amount of dust he is putting out by 30 percent. times $12\frac{1}{2}$ percent.; in other words, he could put out three times as much dust as the man next door, simply because he was operating carbon dioxide in his stack. The law just did not apply to that particular installation.

BY MR. MACAULAY:

Q. What was the solution?

A. The man had to ignore the carbon dioxide content in this particular case, because you cannot allow for it, and you have to give the man credit for putting in the cyclone, when there was no legal reason for it.

Q. Do you contemplate any amendment to the by-law to include a case like that, because no matter what he had, or was putting up, there was too much "junk" coming out of the flue, was there not?

A. I do not know whether he was or not. He may be putting up a little more than the man next door. I forget the figure. But he did put in a cyclone, and did not have to.

I am not a lawyer, and I do not know the answer, but my feeling is that one has to be very careful with legislation at this stage, because we certainly do not have the knowledge upon which to base a law.

BY THE CHAIRMAN:

Q. It needs further study?

A. Yes, it needs further study. There is no use passing a law unless you have something upon which to base it.

BY MR. MORNINGSTAR:

Q. So that the man who put the cyclone in, would save enough in his fuel to pay for it?

A. I don't think he would, in this case.

Q. Is a cyclone a collecting machine?

A. Yes.

Q. You do not save after the dust has been created; you save in the firing?

A. He was not saving anything. He was just suppressing the dust.

Q. So the place to save on fuel is in the firing of the machine, and not in the collection of the dust after the machine is working?

A. This was not a boiler. This was a calcinator, a roasting device. He was not saving any fuel at all.

BY MR. MACAULAY:

Q. May I ask you this? Does your study indicate that you must have something more than a person driving around in a car looking through what I think they call a "Ringleman chart", at a big pile of black smoke? You have to be actually testing from time to time the emission of this stuff out of people's stacks?

A. I think the Ringleman chart is the first thing you have, to go after black smoke, first of all, but it must be done rigourously if you are going to do it at all.

Q. You feel you have to have more than that?

A. Very definitely.

We have just concluded an agreement with the Canadian Manufacturers Association, the Hamilton Branch, acting on behalf of the industry of Hamilton, to carry out a three-year survey similar to the Sarnia survey, in the Hamilton area.

Q. Proving that industry in Hamilton is concerned about it, and wants to do something about it?

A. Yes. They are concerned to the extent that they have put up \$130,000 to cover the cost for the next three years.

Q. I think this question was asked yesterday by Mr. Brandon or Mr. Morningstar: no request has been made

or even a suggestion, that such a survey be carried on by the city of Toronto.

A. We have had no approach from the city of Toronto at all.

BY MR. MORNINGSTAR:

Q. I should think the hon. member (Mr. Elliott) would be pleased to get this information.

MR. MACAULAY: I think he should be proud of his city, that they are doing something about it.

MR. ELLIOTT: That is the reason we have no complaints from Hamilton. We are going right ahead. It is a very efficient town.

THE WITNESS: I started by giving you a complete factual account of what we have done in this up to the present time, to give you some idea of the extent of the legislation.

BY MR. MACAULAY:

Q. You said the tests in Sarnia were costing \$20,000. a year, and the one in Hamilton will cost \$130,000. which is \$42,000. a year. Have you an estimate of what a reasonable test in Toronto might cost?

A. Offhand, it is difficult to say. The two surveys are run under slightly different conditions. The Sarnia survey was group research, of which the

government need only pay 50 percent., and also provides the equipment, which is rented to Sarnia, so they do not have that capital expenditure.

In the case of Hamilton, it is entirely run by the local industries. The government is not contributing, and that \$130,000. contains a figure of something like \$40,000. capital expenditure which will be made in the next two or three months to carry on the survey.

It is about \$20,000. a year, for three years, plus the \$40,000. capital expenditure.

BY MR. THOMAS (Oshawa):

Q. It may not cost that?

A. This was an estimate, and that is the amount of money we have told Hamilton they should have available.

It may cost much more. It depends on what problems we might find when we get there. We may have to have more equipment, or more men on the job.

BY MR. MACAULAY:

Q. Do you know where that \$130,000. is coming from?

A. No, that is not part of my work.

Q. It is not being put up by the municipality, that is, the Corporation of the City of Hamilton?

A. No, I do not think so.

Q. You think it is all supplied by industry?

A. I think it is all supplied by the Canadian Manufacturers Association members, but I may be wrong.

Q. The provincial government contributes the capital outlay in Sarnia?

A. Yes.

Q. Does the equipment belong to you, or Sarnia, or the government?

A. I presume it belongs to the government. We charge Sarnia rental on it.

Q. When you are finished with it, where is it going? Or will you leave it there?

A. Presumably we will rent it to somebody else.

MR. MACAULAY: Well, I hope we can get you to rent it to Toronto.

MR. MORNINGSTAR: I imagine they will need it to carry on tests from time to time.

BY DOCTOR EVIS (Secretary):

Q. You will take what is necessary to Hamilton?

A. Yes, when Sarnia is finished.

BY THE CHAIRMAN:

Q. Have you any further remarks to make?

A. Following up the question of how much it would cost to do a survey in Toronto in the same way we

are doing it in Sarnia, and propose to do it in Hamilton: it is very difficult to give a figure "off the cuff". But if you speak of the Metropolitan Area with a population of 1.2 million, I would say the cost would be at least twice that of Hamilton.

BY MR. MACAULAY:

Q. You think that is about \$60,000 a year for three years, plus the capital investment?

A. I would think so.

BY MR. ELLIOTT:

Q. Do you do tests of the carbon monoxide from the highways, at certain hours of the day?

A. No, we have not done that. There is information available from New York and London, and the figures which are available indicate we cannot expect much of a hazard from that.

BY MR. MACAULAY:

Q. Why did the government of Ontario make a contribution toward the capital equipment involved in Sarnia, and not in Hamilton?

A. I think a short answer is that Hamilton did not want it.

Q. They would much rather be on their own?

A. Yes.

THE CHAIRMAN: It is a very independent town.

MR. MACAULAY: There is a great deal to be said for that.

THE WITNESS: There is only one other point I would like to mention and that is the medical background. We do not enter into the medical background at all. We get reports from the Department of Hygiene, and they give us an idea of what we should monitor.

BY MR. MACAULAY:

Q. What does "monitor" mean? To look after it?

A. We have this Beaver report, which I think you have read, which gives some very interesting figures.

MR. MACAULAY: Doctor Evis, have you any copies of that?

DOCTOR EVIS (Secretary): No. I was going to write for that, but there was no financial support until the Committee was re-appointed.

MR. MACAULAY: Are we in funds now?

DOCTOR EVIS (Secretary): Yes. I will now write for copies.

THE WITNESS: We tried to get similar evidence in Canada from the Department of Health, but the figures are not available yet. We are not lawyers, and we are not doctors, and we only have laymen's opinions concerning legislation on medical matters.

MR. MACAULAY: I am most grateful to you for

what you have told us today. I, myself, enjoyed hearing you, and I am sure the members of the Committee did, also.

THE WITNESS: To just finish up: I gave a paper in New York in March, to the first International Congress on Air Pollution, which was a story of the Sarnia survey.

BY MR. MACAULAY:

Q. I am sorry to interrupt so much, but these things occur to me as we go along. Was there a report of those proceedings?

A. They have just been published in a book, I think by Rhinegold.

Q. How big is it?

A. It is smaller than that (indicating).

MR. MACAULAY: Could we get some of them? This came out just at the time this Committee was set up. I mention it to you in the hope that you, Mr. Chairman, and our Secretary, could go to that Convention, but in view of the fact that could not take place, perhaps the best substitute would be to get a copy of the report.

THE WITNESS: I have copies of the re-print of my paper. The title is "Sarnia Survey; Action Without Compulsion".

Although I am not a lawyer, I had an axe to

grind, because the Americans, to my way of thinking, are rushing into legislation, trying to get Federal legislation, and this paper is slanted slightly toward the belief that if you can get industry to do a job, they can do it better than the cities. You cannot expect a city like Sarnia, for instance, to take on engineers who can tackle the whole combined engineering resources of three large refineries. The city cannot afford to carry that type of men, and I believe the only hope is to get the industries to work with you, not against you.

I also have copies of another paper I gave at Guelph, at the second Industrial Waste Conference which was arranged by the Department of Health of Ontario. That gives the same data, in rather more detail, for local industrial consumption.

BY MR. ELLIOTT:

Q. I would like to ask a couple of questions on the gasoline situation. Let us consider a tank car going along the railroad. They cannot fill it full. Do they not have to allow a certain percentage of gas, to allow for expansion and contraction? Then this lid you say goes up and down on the top of the tank; does that expand and contract with the weather?

A. You cannot put it on tank cars. I was thinking

of the large storage tanks.

Q. So, from the tank cars, there must be some evaporation?

A. I would imagine the tank cars would be sealed, and when the temperature goes up, it increases the pressure.

Q. Consider the men with tanks buried in the ground; there is a certain loss, because they have to have vents to let the air in to let the gas go out. They claim two percent. and that is two percent. from every gas tank in the country.

MR. THOMAS (Oshawa): It is evaporation and wastage, both?

MR. ELLIOTT: They claim evaporation.

MR. GORDON: The government stated it was less than 1 percent. -- a very small amount.

MR. MACAULAY: What happens to that? Were they allowed a rebate on the year?

MR. THOMAS (Oshawa): Yes, just before the election.

MR. MACAULAY: Are they continuing it after the election, Mr. Thomas?

MR. THOMAS (Oshawa): Yes.

MR. GORDON: Would it be less than 1 percent.?

BY MR. ELLIOTT:

Q. Have you any idea what they would have from

a tank in a gasoline service station?

A. I would think it would be more than 1 percent.

THE CHAIRMAN: Are there any further questions to ask of Mr. Newbury.

MR. MORNINGSTAR: This has proven very, very interesting.

MR. GORDON: It was a very intelligent presentation.

BY MR. MURDOCH:

Q. Are you in Toronto most of the time?

A. My official headquarters are in Toronto, but by the time I visit Hamilton, Sarnia, and other places, I spend about half of my time here only.

BY MR. ELLIOTT:

Q. Are you setting up an office in Hamilton?

A. Yes.

BY MR. MORNINGSTAR:

Q. Have you ever been in Welland?

A. Not officially, no. I have been down to Niagara Falls, to look at the bridge.

BY MR. MACAULAY:

Q. I was wondering if you have determined the effect of cigar smoking on this question? I am prompted to ask that question by looking at my two friends from the western part of the province.

How long would it take to set up a test?

A. What kind of a test are you thinking of?

Q. If you were going to do a survey in Toronto?

A. Oh, I see what you mean. A test of a single stack is something you cannot do in two days. You have to get a staff together. I would say something in the order of from four to six months to get it going.

There is one aspect of our work which I left out, but which is very important. I think it is pioneering work which we have done on behalf of Canadian industry.

A firm was putting up a new factory -- eventually they will put up two -- and we were asked to go to Sarnia and carry out a survey of the area before the plant was built. We were actually there during the time they were breaking ground. We carried out a nine-months' survey of that area before the plant was built.

After the plant had been put up, and had settled down and was running steadily at full capacity, we went back and did a survey with the plant running.

We, first of all, convinced the plant that it would be a good idea to expand during the designing stage, and spend a little extra money on extra pollution-suppressing devices, as a public service, as a public

relations point, and also to guard against legislation.

They did that, and put in an extra piece of equipment and during the second survey, we were able to find how much pollution they had added to the local atmosphere, and allowed us to check up on the efficiency of the extra equipment which they had installed.

We have done two others, one in Kingston district and one in Brockville.

Q. The one in Kingston was for what company?

A. Both were for Canadian Industries.

Q. That is, the C.I.L.?

A. The first one was the Malleable Iron, which was handed over to Ottawa. The other was handed over to the C.I.L.

We feel that is a new concept, by going into these matters before development, that is, where a firm is opening up a new area which is predominantly agriculture or holiday, and opening the site, and then the plant is built, and we go in and re-assess it, to see that the suppression equipment which was put in is, in fact, doing the job for which it was designed.

BY THE CHAIRMAN:

Q. There is a question I would like to ask. In your comments, you said the study of smoke control and air pollution is a new thing in North America?

A. Yes.

Q. And you suggested that we go slowly with legislation, and move more along studying it to make sure we are headed in the right direction, before we engage in a certain amount of compulsion?

A. Yes.

Q. I agree with that thoroughly. But in the Old Country, in Scotland, and the great Ruhr Valley in Germany, they must have been putting up with this problem for many, many years. Are we in a position to benefit from their long years of experience in lining up our programme on this side of the water?

A Of course, Britain and the United States represent the two extremes. I consider Canada is more or less a compromise between the two -- having a different approach to this problem.

I can refer you to a paper published in a book which is now available, called "Air Pollution", published by McGrath and Hill, the report of a conference called by the President of the United States to study the air-pollution problem in 1951, and in that book, or paper, I think Mr. Damon, the Chief Alkali Inspector in England and Wales, associated with the Ministry of Housing, and local government, outlines the situation. This appears in the report of

the Committee on Air Pollution in Great Britain.

BY THE CHAIRMAN:

Q. About what year?

A. That would go back to 1840.

BY MR. MACAULAY:

Q. That is not the paper; the distilling was in 1840.

A. Yes, the paper was in 1951. The Alkali Act was passed, which permitted the appointment of a Board to endeavour to see what industry could do. Up to the present, it is the law in Great Britain. It has been changed and modified, but, in effect, the law still puts the onus on the inspectors to formulate an opinion as to what is a reasonable extent of the effluent from a plant.

BY THE CHAIRMAN:

Q. How far will they go in introducing anything of a compulsory nature?

A. They have compulsory powers, but they use this Act only after everything has been done along educational lines.

Q. They try education first?

A. Yes. In other words, they recommended in those days -- and still do -- but they do not know the solution to this problem.

Everybody knows what is wrong with Sudbury, but we do not know what to do about it.

The inspector is given the onus of deciding whether each firm should do its utmost toward what they can reasonably be expected to do.

BY MR. MACAULAY:

Q. Does that involve their capacity to pay for collecting equipment? What one company can do may not necessarily be what another company can do, although they both might be putting the same amount of "junk" up the flue, in view of the fact that one plant might be able to do more financially than the other.

A. No, it is technical, not financial.

Q. How can you separate them? You can say, "Technically, you can stop this if you put in a collection machine", but one company might afford it, and the other could not.

A. That would not be an excuse under the law. If the design of the collector is known, the companies must put it in.

Q. Whether they can afford it or not?

A. Whether they can afford it or not.

BY THE CHAIRMAN:

Q. Just as you said, when everything else has been done, you can still "lay it on the line", and say,

"Put it in".

A. Yes.

BY MR. MACAULAY:

Q. That puts us in a state of flux. Instead of putting down a lot of standards, after a sufficient amount of the "coddling process", you can say, "In my experience you can do this, and you have to do it."

A. Yes. If you go to an inspector -- and I have spoken with Mr. Damon -- and say, "What do you think is reasonable legislation for testing?", he will say, "We think that today people can get a value of 40" -- or any figure -- and that figure "40" is then written into the law. In five years, it might be "80" or within the next year, it might be only "20". It is up to the inspector to decide whether the legislation in that form is reasonable.

Q. But you immediately imply these men have access to a fair amount of knowledge, and a reasonable investment in equipment; otherwise, you apply the "40" forever, unless you have some different evidence upon which to base a different figure, in regard to the organization of which he was a part. There have been improvements both in equipment and knowledge as to the things which can be done?

A. Yes.

BY MR. MORNINGSTAR:

Q. Then it really is up to the municipalities to enforce their by-laws for smoke control? Supposing in the city of Toronto they had by-laws to control air pollution; what about any other municipality? They might have the same condition there, and think it would be alright. Therefore, I think it should be on a federal or provincial level to inspect these industries. If you are going to force it on every industry, it should be on the same level, doing the same kind of work.

A. Britain is smaller and more closely knit, and there they have only one government, which we may call the "Federal Government" and the Alkali Inspector is a servant of the Federal Government.

BY MR. MACAULAY:

Q. Do they envisage any analogy to that in the United States?

A. I understand the other day, when reading an article, that the President had set aside \$5 million for a study in an endeavour to decide what can be done in regard to what legislation can come out of it and I envisage that it may be a Federal responsibility.

A. No. I do not think the \$5 million is for legislation; it is for technical investigation.

Q. Is it your feeling that if it is successful, say, in the United States, it will be done on a municipal-state or Federal level?

A. That is a difficult problem. I do not think you can deal with it on the lowest level. If you follow the literature, you will find that New York and New Jersey are having an awful job getting together -- there are really three States -- to form a tri-State body to control the whole of that area.

It is obvious that New York cannot do anything with New Jersey lying so close to it, and you have to have a body covering the entire area.

I would suggest that Toronto and Windsor is one area, but whether you can integrate it up to the provincial level, I do not know.

Q. It should come at the lowest stage at which it can be effectively dealt with?

A. Yes.

THE CHAIRMAN: That is what the \$5 million is for.

BY MR. MURDOCH:

Q. This problem is recognized by both Washington and Ottawa, especially as it concerns the International Boundary -- that is for sure. Each government has a Board which advises the International Joint Commission,

from both countries, paid for by the Federal government, and anything they recommend from their studies, comes under the Commission's jurisdiction, as it affects the International Boundary. I believe, in such places as Sarnia and Port Huron, and Windsor and Detroit. As you know, you cannot separate Windsor from Detroit.

BY THE CHAIRMAN:

Q. Do you not think it is up to the great industrial province of Ontario to possibly take the lead in this matter of air pollution, and smoke control, because in some provinces -- and I am thinking of Prince Edward Island and some of the others -- they have no problem with air pollution at all.

I would be opposed to putting too much responsibility in the Federal laws. If it were on a provincial level, any time a province had the same industrial development as Ontario has, and will continue to have, then it can be put on the Federal level. You can think of our borders, and those of other Canadian provinces to date, and in the foreseeable future they may have to consider air pollution and smoke control, taking a lesson from Ontario and Quebec, in regard to their own industries there.

We have our own congested areas to consider, long before it has to be put on the federal level.

A. I think so.

BY MR. MACAULAY:

Q. I think Mr. Newbury agrees that it should be dealt with at the lowest level at which it can be done effectively. If it can be done by joint municipal and provincial action, I think that is the level upon which to deal with it.

BY THE CHAIRMAN:

Q. Would you suggest basing Ontario legislation along the lines used in Great Britain?

A. I would like notice of that question, Mr. Chairman.

Q. You are familiar with this whole problem and with the situation in Great Britain. What is your opinion?

A. I think it should be given very, very careful consideration, for this reason: Los Angeles, for instance, may have a set-up where you have to have a license to build a plant, and you build it, and start it, and then they may take the license away and say it is not good enough.

Then you make it better, and start up and run it for three years, and the smog situation gets worse,

and they say, "We forgot to put so-and-so in your license," and you never know where you are at. I think that is a very bad way of carrying it out as it creates a very unsettled condition.

BY MR. MACAULAY:

Q. Has it been unsettled in England?

A. No, because the changes in Britain have been gradual, with the increase in technical knowledge. In Los Angeles, the changes have been due to what is considered to be of necessity.

BY THE CHAIRMAN:

Q. A great deal of it is done on the spur of the moment?

A. Yes.

Q. I think they stopped the oil companies from operating for a time, but I do not think it made a tittle of difference.

MR. MURDOCH: This matter has been dealt with rather effectively at the present time with regard to new plants, because any plant of any size which is built to-day has to be approved by our Department of Labour for safety, and so forth, and it would certainly include some type of air-pollution prevention, where it is necessary.

I think the Department of Labour, under the

Factory, Shop and Building Act, could also insist on this being put in, in connection with the Ontario industries.

MR. ELLIOTT: That is right. I am having my troubles with them all the time.

MR. THOMAS (Oshawa): I think that is a very good point, Mr. Chairman.

MR. MACAULAY: You think the less governmental intervention the better, and I agree with you, but there comes a stage where you have to compromise.

MR. MORNINGSTAR: That is why I was suggesting that the municipalities themselves should get together.

BY MR. MACAULAY:

Q. Do you mean to intimate that in Los Angeles they have the same kind of power as in any of the bylaws?

A. They have a licensing arrangement in Los Angeles --

Q. No, you can point out that Los Angeles had an unfortunate experience, but we should not use it as a pit into which we may fall if we adopted it.

A. I think the Los Angeles licensing procedure is a bad thing.

Q. Is it the same as the English?

A. No.

Q. That is what the Chairman asked. He said, do you believe we would be wise to adopt the English system,

that is, to adopt something along the lines of the English system?

A. Yes, I understood it, and I said it should be very carefully considered.

Q. Well, that is one of the most guarded answers I have heard in the last three weeks. You mean by that we should give it careful consideration before adopting it?

A. I think we should before adopting it. I feel there is a certain psychological attitude that you get in Britain, and the local situation here may have to be modified to take care of that.

BY THE CHAIRMAN:

Q. Supposing I asked you this question: Do you think the advances made in Great Britain in the matter of air pollution and smoke control, would warrant a committee of this kind -- or a subcommittee -- visiting Great Britain? What is your technical opinion?

A. I think you would learn quite a lot, yes.

Q. Which we would not learn in the States?

A. Yes. They have a completely different approach and a different system, which I think is more flexible and works better.

Q. And would be more applicable to our Canadian way of life? These are good statements you are making

now, and that is the type of thing we want to know.

A. You probably will guess from my accent that I am not a Canadian by birth.

BY MR. MACAULAY:

Q. And you are not from Alabama, either.

A. I am still trying to assess the Canadian character. To me it is a compromise between Britain and the United States.

BY THE CHAIRMAN:

Q. How long have you been here?

A. Four years. I think it might work.

BY MR. MACAULAY:

Q. Tell me this, following what the Chairman has asked you: If this Committee were to go to England, what preparatory steps should we take? I do not think it would be wise to land on the shores of Britain like a neophyte de novo, but some preparatory arrangements should be made. If so, what?

BY THE CHAIRMAN:

Q. Would your organization undertake to supply us with that information before we went?

A. I think we could undertake to supply it, yes.

This report (indicating) by Sir Hugh Beaver is a report which apparently you have not yet seen. I will read you what he says:

"We were appointed on the 21st July, 1953, with the following terms of reference:

'To examine the nature, causes and effects of air pollution, and the efficacy of present preventive measures; to consider what further preventive measures are practicable; and to make recommendations.'"

That was the report of Sir Hugh Beaver, and he was asked to form a committee after the very shocking smog of 1952.

BY MR. MACAULAY:

Q. You think that report is sine qua non --

A. I think you should read the report, and then go and see Sir Hugh Beaver, who, with twenty technical experts of Great Britain, spent the best part of a year getting this information. He knows the whole story, and all the people tied up with it.

BY MR. ELLIOTT:

Q. Is it not true that they did not have smog in Britain until after the last war, and after the refineries were built?

A. You are using the word "smog", which is being bandied around quite a bit, but when we get scientific, we do not use the word, because it means almost anything.

Q. The truth was up until the last year or two, it

was unknown, until the oil refineries were built in London?

A. No, that is not true. London fogs have been traced back to 1870.

Q. That is what they call an "oil smog"?

A. No, I think it is the old coal fires again.

Q. They had the same thing at Dusseldorf, in Germany, and they claim that it is more severe than they ever had before.

A. Industry has become more efficient. They are burning more fuel, and making more production per cubic foot of land than ever before.

Q. Then commercial and ordinary chemicals were not being used before?

BY MR. MACAULAY:

Q. Mr. Newbury does not know what "smog" is. They did not know the cause of the Black Plague, either. Mr. Newbury said the fog went back to 1870.

MR. ELLIOTT: In Dusseldorf they claim that you could not walk two blocks without holding a handkerchief over your nose, the same as in London, and they did not have that at all until the oil refineries came in.

THE CHAIRMAN: They had certain things, and the word "smog" caught on with the public because it was a dandy name, easy to remember, and people liked it, and

they heard a great deal about it.

Although they did not call it "smog", they have had the same condition in the old-land industrial areas for years.

A. I think so.

THE CHAIRMAN: Mr. Newbury, on behalf of the Committee I would like to thank you very much for coming here this morning, representing your organization. I think the information we have gathered from your very comprehensive report, and your clear-cut remarks will really launch us on our way. It is just about as good as anything we could possibly think of.

I think one of the important things that we would gather from what you have said will lead us to suggest that our Department of Planning and Development, in the planning of the provincial areas, should certainly take into consideration the matter of air pollution and smoke control, as it affects the residents. I do not know whether that is being done now, but, if it is not, it should certainly be started, and it may be one of our findings, which comes out of this Committee. If we start now to build houses in residential areas where there will be a possibility of an oil plant being erected shortly thereafter, it will be foolish.

THE WITNESS: Another thing which is important

to consider is the long distance effects of air pollution. We know it travels hundreds of miles in regard to diffusion, or some action of some kind, and I can envisage in the future Toronto and Hamilton growing together into one big city.

THE CHAIRMAN: You have made some mighty fine statements for only being over here four years.

MR. MACAULAY: In view of the fact that Professor Allcut may not be able to spare much time to this Committee, when we visit some of the areas, could we not ask Mr. Newbury to accompany us as a sort of technical adviser?

BY THE CHAIRMAN:

Q. Are you in a position to do that, Mr. Newbury?

MR. MACAULAY: We do not mean as a public servant, if the thought of the cash register was running through your mind. We mean to be retained by the Committee as a consultant.

MR. MURDOCH: That is correct, because we find when we go to these bodies requesting information of this kind, it looks better to have a technical adviser with us to advise us on matters about which we are not in a position to know.

THE CHAIRMAN: Well, we have a very outstanding Secretary, who happens to be a medical doctor.

MR. MACAULAY: Our Secretary is interested in the effects on the body; that is his capacity. Mr. Newbury has been talking about causes, not the effects. I do not think Mr. Newbury suggests for a moment what this pollution is, once it gets into the air itself; all he is interested in is how it got there.

MR. MURDOCH: In reference to what Mr. Macaulay and the Chairman have said about our Secretary, may I say that I am afraid we have so much confidence in the ability and knowledge of Doctor Evis, that we are piling far too much work on him right now. When we leave a meeting, he must have a couple of weeks' work ahead of him, and I strongly suggest he have some assistance.

THE CHAIRMAN: We need an engineer's point of view.

MR. MACAULAY: It is the difference between cause and effect. If we get information from our Secretary, it is in the form of effect, whereas from Mr. Newbury, it would be in the form of cause.

THE WITNESS: How much time would it involve?

THE CHAIRMAN: We are not in a position to say that at the moment, Mr. Newbury, but we would like you to say you will consider it.

THE WITNESS: I will certainly consider it.

THE CHAIRMAN: From time to time, we would like to be free to call on you.

THE WITNESS: I would certainly consider it, but I have the laboratory to run, and I could not devote, say, three-quarters of my time to the Committee.

THE CHAIRMAN: No, I do not think we would have to ask you to do that.

MR. MURDOCH: There might be some three-day periods when you could accompany us.

THE WITNESS: That might be arranged.

DOCTOR EVIS (Secretary): If Mr. Newbury is not available, we still can use Mr. Belyea, the engineer with the Hygiene Division, who has had considerable experience with air pollution.

THE CHAIRMAN: Well, we thank you very much.

---The deponent retired.

---The prepared report by Mr. Newbury was admitted into the record, and marked as Appendix "A" following these proceedings.

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THE CHAIRMAN: At two o'clock, we are going to meet the Smoke Abatement Officer, who will take us on a tour of some of our Metropolitan Area.

MR. MACAULAY: I have to be in court this afternoon, and I may put you in escrow. I know we

should get statements from these gentlemen who know exactly how much equipment they have on hand, and how it is broken down.

THE CHAIRMAN: Do you mean to say you have not that information as yet?

MR. MACAULAY: Yes, but it is apparently different in value.

MR. MURDOCH: Are we going to do anything today about setting the time and place for our next meeting?

THE CHAIRMAN: The Secretary and I have been doing some thinking along those lines, and if everybody is agreeable, we plan early in October to visit some of the cities in the United States.

MR. MURDOCH: I would like to know in advance where we will be, because I have to work the dates in with other arrangements.

MR. MACAULAY: Unfortunately, I have to go to New York until the 9th of October. It is obvious this cannot be ready in final form for some time, and I wonder if you could be good enough to make arrangements whereby you could go after the 10th of October, for example.

THE CHAIRMAN: We will take all those things into consideration, if you will leave it to the Secretary

and myself.

As we are all aware, that if we postpone this until such time as everybody is agreeable, we probably would not get away until next July. Having regard to the conditions where we are going, and the times of the officials in those places, and, as far as possible, the time of the members, we will line up these trips to the best of our ability. I do not think we can do it in any other way.

MR. MACAULAY: If it is convenient to go after the first 10 days in October, I would be grateful. I would like to make one of these trips with you.

MR. MURDOCH: Could we have one of our future meetings before we get away, from the Departments? I think we should have somebody here from the Department of Labour to see if they are doing anything now that is new in regard to the building of new plants, and checking on the air pollution which may be caused by those new plants.

MR. MACAULAY: Do you mind having Mr. Neilson, in compliance with Mr. Murdoch's request? Would it be objectionable to the Committee, even though he has been here, to have him recalled. I understand he is going to accompany us this afternoon, but I would like to have his testimony here with reference to certain

matters. Would it be convenient to have him here again?

MR. THOMAS (Oshawa): Say next week, or the week after.

THE CHAIRMAN: Well, we will adjourn now until two o'clock, to re-assemble in front of the Parliament Buildings.

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---Whereupon at 12:15 of the clock p.m., the further proceedings of this Committee adjourned until this afternoon at two o'clock, p.m.

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A F T E R N O O N S E S S I O N

Toronto, Ontario,
Wednesday, September 21st, 1955,
2:00 o'clock, p.m.

- - - - -

The further proceedings of this Committee
reconvened pursuant to adjournment.

---The Committee reconvened for the purpose of touring
the northwestern portion of the Metropolitan area,
and the following members of the Committee were
present:

Mr. A. H. Cowling, Chairman,
Messrs. Morningstar,
Elliott,
Murdoch,
Brandon, Q.C.,
Gordon,
Hon. Mr. Kelly
Dr. Frederick Evis (Secretary).

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APPEARANCES:

Mr. John Neilson,	Chief Smoke Abatement Officer for the City of Toronto.
Mr. W. L. Clifton	Chief Locomotive Foreman, Canadian Pacific Railway, Toronto.

Mr. James B. Small, General Superintendent,
Glidden Paint Works.

IN RE SANITARY AND SANITATION COMPANY

MR. NEILSON: Here the fumes are emitted, coming from the small cupola and the best form is a water-wash scrubber in the bag house, where they can retain the material which comes out with that smoke, but these plants and foundries do not come within the by-law. They are exempted from the provisions of the Toronto by-law.

We feel if we could include them in the by-law, it would cut down a great deal of feeling with regard to exemptions in some cases, of one being in but not another. We think if we could make everybody equal, it would be much better.

THE CHAIRMAN: What will it cost for them to come under the by-law?

MR. NEILSON: An installation would cost anywhere from \$80,000. to \$100,000.

THE CHAIRMAN: Would that make a good job?

MR. NEILSON: Yes.

THE CHAIRMAN: As long as they "get away with it", they will not bother about it.

MR. NEILSON: They will not do anything to get

away from this condition, until something is done. Our feeling in the matter is -- and as we have been advised by people -- they do not mind that so much, as that they will they are being isolated by being under the by-law.

They say they would be very happy to be brought into the by-law, and they have made quite a good clean-up, and we are on the job, and being satisfied with it.

I said to one of them, "What is your argument about now being taken into the by-law?", and they say, "We do not mind spending the money, but we feel we are being isolated; you put the onus on us and put us to this expense, while the other people are not being treated in the same way".

I said, "That is my contention. If everybody was on the same footing, and could be brought into the by-law, there would not be this sense of isolation".

Supposing an industry across the street was committing an infraction for, say, ten minutes a day, perhaps three or four times in the day. You would not do anything about it. But they say, "Here is a place across the street going night and day, why put us in the same class with them?" It created an inequality, which is not just right.

THE CHAIRMAN: Why were they not originally

included in the by-law?

MR. NEILSON: First of all, when the demand for metal and bricks for construction was so great, they said "We will make lots of smoke to meet the demands" and they were told, "Make any smoke you want, but get the stuff out".

THE CHAIRMAN: And if a war came along, they could do it again?

MR. NEILSON: Yes.

THE CHAIRMAN: That is a good point.

MR. NEILSON: Lots of people who are isolated at the present time would be happier if it was made effective all over.

THE CHAIRMAN: You said the city is spending \$50,000.00 on salaries, and so on?

MR. NEILSON: Yes, it is.

THE CHAIRMAN: What portion of that would be spent on equipment?

MR. NEILSON: Practically nothing. We have no equipment at all. Most of it belongs to the Division of Hygiene at the University and they are loaning it to us at the present time.

We have three thousand or four thousand dollars from an appropriation, and I would say that four thousand dollars, or five thousand dollars at the most, has been spent on equipment.

THE CHAIRMAN: You need more money for equipment?

MR. NEILSON: Yes, and Professor Allcut wants a travelling laboratory, so it can go anyplace in the city, and make a test.

THE CHAIRMAN: We had a man before us named Mr. Newbury. He told us he had three or four of these things, and the cost is really just "chicken feed".

MR. NEILSON: Yes.

THE CHAIRMAN: Have you endeavoured to rent one for a trial?

MR. NEILSON: No, I do not think so. Professor Allcut is pretty close to Doctor Fisher, and Mr. Newbury. The city has turned us down in most cases.

THE CHAIRMAN: If you had or two instruments, or pieces of equipment, it would be a good start in the Metropolitan area?

MR. NEILSON: Yes, that is so.

We will stop here and look at Wagman's.

IN RE WAGMANS

MR. NEILSON: All the wastage from the Malton Brass, and the Malton Aluminum goes through a cooling type of container, and it presently goes through the bag house, which is situated at the base of that chimney (indicating). There is an adjustable mechanism, and

the smoke, instead of going up here (indicating), is by-passed, and goes out there (indicating).

Any zinc sulphate which is processed from the cupolas is passed through the bag house, and the zinc is retained.

THE CHAIRMAN: These gadgets (indicating) on the top of the chimneys, are put on to co-operate in the smoke abatement?

MR. NEILSON: Yes.

DOCTOR EVIS (Secretary): They used to have considerable white stuff coming out there.

MR. NEILSON: Yes.

DOCTOR EVIS (Secretary): It used to be pretty bad.

MR. NEILSON: Yes.

THE CHAIRMAN: That is an indication of the steps which are being taken, and proves that some advancement is being made.

MR. NEILSON: When we were out the last time, we went to the Canada Metals, and the work here is much the same.

HON. MR. KELLY: They are dealing with minerals, and of course they are finer than the others.

THE CHAIRMAN: Do they come under the by-law?

MR. NEILSON: Yes. This (indicating) only lasts

for a short period.

THE CHAIRMAN: Six minutes?

MR. NEILSON: They only last for about a quarter of a minute, and not more. That one (indicating) is six minutes in any one hour. That is the Viceroy Rubber Company. Our inspector here knows the conditions, and makes his report.

DOCTOR EVIS (Secretary): What is that yellow stuff coming out? (indicating).

MR. NEILSON: There is sulphur in there. That is in the cupola. They are all outside the by-law.

MR. MORNINGSTAR: Why do you say "six minutes in an hour"? Are they stoking up?

MR. NEILSON: There are automatic stokers there, and when a stoker goes off, there is a slight lag, because there is a fan in connection with the stoker.

They also may be extracting the ashes. That may be another reason.

MR. ELLIOTT: There is another one further down, with smoke going straight up (indicating).

THE CHAIRMAN: This is one of the good days. If they were all like this, there would be no problem.

MR. NEILSON: Of course, any person with a truck on the street, can be stopped by an inspector

and asked where he is going. If he is delivering bituminous coal to a place where it would be hand-fired, they could be fined for that.

THE CHAIRMAN: What is meant by volatile coal?

MR. NEILSON: It is coal you can break with your hands almost, and the volatile matter is the substance which composes the soft coal. It is not as mature as the anthracite, which is much older, and owing to the pressure of the earth has been solidified. Soft coal has not been as much solidified as the bituminous.

AT THE CANADIAN PACIFIC RAILWAY ROUNDHOUSE
(Runnymede)

THE CHAIRMAN: How many stacks are there here?

MR. NEILSON: Thirty-two or thirty-four.

HON. MR. KELLY: Is this the Canadian Pacific or the Canadian National roundhouse?

THE CHAIRMAN: The Canadian Pacific. This is where all the freight engines come from the east and north. It looks nice and clean here today.

MR. NEILSON: The Canadian Pacific is co-operating very well, I must say.

THE CHAIRMAN: In regard to the by-law, these exemptions occurred during World War I, and in order to amend the by-laws --

MR. NEILSON: The exemption clause in the statute says that if the city wants to include certain types of factories into the by-law, it can do so. But the intention has to be filed from the city legal department, giving one month's notice that they intend to amend the by-law.

Any one who wishes, may appear before the Advisory Board on a certain date, and if the Advisory Board turns them down, it can be taken further to the Municipal Board, and the Municipal Board will decide whether they shall come into the by-law or not.

THE CHAIRMAN: They may apply to the Ontario Municipal Board?

MR. NEILSON: Yes. This is the first thing we started to do, since the new by-law came into effect.

THE CHAIRMAN: After World War I, up until the new by-laws, there had been the old by-law, but that was very effective, and the Council laid down permissive legislation, but the city threw out the by-law and brought in a new one.

MR. NEILSON: The government only has the power to make laws. We can only act on the authority given by the provincial government. The statute specifically states that all foundries and brick works are exempt from the by-law.

THE CHAIRMAN: Then it is not the city at all?

MR. NEILSON: No.

THE CHAIRMAN: It is our responsibility?

MR. NEILSON: Yes. It is a provincial government matter. I think it is Section 4, subsection 5, in the Statutes -- the Toronto Act.

THE CHAIRMAN: If our Committee recommends to the government to take these people into the by-law, that is it?

MR. NEILSON: Yes.

THE CHAIRMAN: If the province, through a recommendation by the Committee, will give the city permissive legislation to control all industries, then the onus is on you?

MR. NEILSON: Yes.

THE CHAIRMAN: And if you want to exempt somebody, you can do it?

MR. NEILSON: No, not under that clause. The only thing we could do is to send out a notification telling them we intend to take them in.

THE CHAIRMAN: Have you had a test case?

MR. NEILSON: Yes. There are two now. The Manganese, and the National Iron Works on Cherry Street.

THE CHAIRMAN: They are just being processed now?

MR. NEILSON: Yes, and they can appeal. We are no further ahead now. That clause in the statute should be eliminated altogether. It is a rather tedious business. It should be automatic for any and all of them, and not just be taken up one by one.

THE CHAIRMAN: I think the whole statute should be amended, to give the municipalities permissive legislation, and if the municipality wanted to exempt anybody, under the law, they can do it. If you had permissive legislation, you could exempt anybody without reference back to the government.

MR. NEILSON: Yes. This (indicating) is an oil lighter, which is put in over the coal, and is a mixture of oil and air, and the quantity of coal is determined, and the smoke will not rise up as much as if they used simply the coal.

MR. CLIFTON: The object of putting the fire on in this way is to put the coal in the grate when the firebox is hot, and that dries it out.

MR. ELLIOTT: Do you put the coal in by hand?

MR. CLIFTON: No, we use the stokers. They put the coal in evenly.

MR. ELLIOTT: Do you fire by hand?

MR. CLIFTON: Oh yes, and then the stoker is put on. The coal is put in with the stoker, and it

is dried and you have easier ignition, than by using wet coal.

The firebox is hot, and the arch is hot, and that dries the coal out.

They have tried different chemical mixtures in with the coal, and have almost convinced ourselves that if you keep at it long enough, there will be no smoke at all, but in actual work, it does not turn out that way.

We have so many branch lines here, that we require small power. The Diesels can only be used a certain percentage of the time, and it does not pay.

MR. ELLIOTT: In other words, the Diesel has to be used continuously?

MR. CLIFTON: Yes. They can use one for three jobs, and continue working right straight through.

ENROUTE

MR. NEILSON: This (indicating) is a case which happens when we are not around. They are burning books and papers in an open fire, and I told them it had to be stopped. They can take them to the incinerator, which is not too far away. Burning them in an open fire is forbidden.

THE GLIDDEN PAINT WORKS

THE CHAIRMAN: This outfit is not under the by-law?

MR. NEILSON: Yes, it is under the by-law, Mr. Chairman.

MR. SMALL: I will tell you a little bit about this while you are finishing your smokes, because you cannot smoke in there.

Mr. Neilson has been here a number of times, as has also Mr. Cork, and Doctor Ward.

We have been engaged in the manufacturing of paint and varnish for about forty-three years, and we have extended to the next street beyond our warehouse, on Ruskin Avenue.

The equipment we have been in recently is of a new type of synthetic resin processing plant. We did that, for several reasons; the first was because we wanted better material at a lower cost, so economy entered into it. At the same time, we also wanted to make Mr. Neilson happy, and we thought we could do these things without the emanation of odours and fumes.

We still have our old type of varnish fire, which we are forced to use.

The new unit is not new in Canada. There are quite a few of that particular type, and it is the best

and the latest design. We spared no expense in getting something for our money.

THE CHAIRMAN: What is your official capacity, Mr. Small?

MR. SMALL: I am General Superintendent. We have different plants here, and one in Montreal.

THE CHAIRMAN: As Mr. Neilson has told us, your organization is one which has co-operated and done a job, and we are interested in what you have done.

MR. SMALL: We think we will not lose anything by co-operating. This place (indicating) was only a field when we came up, and erected a little building, the little vine-covered building which you see there (indicating) was the original building. The neighbors have really come to us; we have not gone to them.

We make a point of having good Union relations. We try our best to deal with them in a way which is beneficial to the Unions, as they are the ones who do the work.

In regard to the human relations; we get along well with our neighbors. You know, if your neighbor's dog gets into your rose garden, you do not like it, but you get along with him just the same, and we try to do the same thing. We do not always succeed 100 percent., but we try.

MR. NEILSON: Incidentally, that is the Grinnell Company's place across the street (indicating). The cupola has a wire netting designed to cut down some of the particles of smoke. It is just a lovely wire netting; that is all it is.

MR. SMALL: We opened a plant in Montreal just a year ago.

The old method of making varnish was by means of an open fire and high stacks. The old varnish stack is right there (indicating). There are six fires in there. You cannot see any vapour coming out of there.

In the past fifteen or twenty years, the varnish and paint industry -- which, of course, is a chemical industry -- has gone more into the use of the closed system, and doing all these things by synthetic means. Everything here is done by means of a closed system, scrubbing devices, and cleaning devices, so that really nothing but air comes out of the stacks and there is, therefore, no odour, and no solids produced into the atmosphere at all.

This is a two-storey arrangement, and the heating is done in the second storey.

THE CHAIRMAN: You start at the top, and work down, the same as in the abattoir?

MR. SMALL: Yes.

This (indicating) is the very top part of the 1500-gallon kettle. It is all stainless steel, and is checked frequently. This (indicating) is the means by which we heat it to a minimum by which the liquid is heated in the room below. That circulates through the jacket of the kettle, and gives the heat to the ingredients of these products. Everything is electrically controlled, by every mechanical electrical device, of which we know.

The raw material liquids are pumped up into this tank (indicating) and are stirred by air. They are pumped up here on a scale, and the heat is applied and the solid ingredients go through the top part here (indicating), which is electrically controlled, and the whole kettle can be filled with carbon dioxide gas.

As this gets hot, it is recorded on a chart, which is enclosed --

DOCTOR EVIS (Secretary): That is to avoid an explosion?

MR. SMALL: I do not know why. Everything here is explosion-proof, the lights, switches, and everything else. Even the boys are not permitted to wear any steel on their soles or heels. The valves on the surface tank are explosion-proof. We have done all we can to make things safe and free of hazard.

The contents are cooked at the desired temperatures, for the desired times, and then when it is ready, it drops its contents out of the kettle, which is done by means of a reducer, which I will show you. The various paints and varnishes are taken off in these pipes and gadgets, to give us the various types of product we want.

These products which are cooked go immediately into a solid state. That pipe leading off there and down (indicating) is called the "scrubber", and that is where the things are washed out. If it has a tendency to move too rapidly, it is controlled electrically. Eventually, when it comes out of the stack, it is nothing more than air. I can show it to you and you will not recognize it as a stack.

MR. ELLIOTT: This is where you make the varnish?

MR. SMALL: Yes.

MR. ELLIOTT: And the shellac?

MR. SMALL: No, we do not make shellac at all.

MR. ELLIOTT: You make the varnish by the barrel?

MR. SMALL: About 1500 gallons "at a crack".

When standing here, you do not see any pipes, but there are thousands of them, and the finished varnish

goes out by pipes.

We handle everything in the largest bulk size possible, anything larger than a drum. We put all this stuff into two-thousand gallon tanks.

This (indicating) is the business end of this thing. The operator who works this equipment is here. This is his station. He has to watch these charts. We have lights flashing, and all sorts of things. He does not have to be an engineer nor a chemist, but simply a heady operator. He has to be ingenious.

MR. ELLIOTT: In other words, he has to be a chemist as well?

MR. SMALL: It helps, but it is not necessary. These are all controlled by our control laboratory, which is on the other side of the street. This building is designed in order to have another complete unit. I hope we will have to have another one before the end of the year. We have two factories to supply, one in Montreal and one here, and the demand is very great.

Now, from the ground floor, you can see that (indicating) is the kettle up there. The time is up. Let us say that our process has gone to completion. The next thing to do is to reduce it.

Varnish, as you know, is liquid when you start and you bring it on, and eventually it hardens, and that is it. We have to have a minimum expansion, and it is put into this tank here (indicating), and is then measured by weight on this scale (indicating) -- the whole tank is on the scale -- and you measure the solvent by weight, and drop the contents into the reducing tank, and see that it is kept stirred up, and then we put hot water, or steam, or cold water in it, and this tank reduces it, and then it is processed to purify it.

Where the man is cleaning, there is a large column we call the "scrubber" and there are baffle plates in there all the way down, and the water spray hits the baffles at considerable velocity, and it washes them down into the drum.

Right in the center is a baffle which comes near the top, so the stuff has to pass through water, over the baffles, and up again, to the blower which takes it out of the stack. That is it right there (indicating). You can stand here all day long, and you will never see anything.

HON. MR. KELLY: What is your investment here?

MR. SMALL: Pretty close to \$1 million. The

whole business was engineered to accommodate this type of equipment. You just cannot put this stuff in any old building. We learned that the hard way. By engineering the building to fit the equipment, we got the best results. For that reason, we built this (indicating) and I think we did well.

THE CHAIRMAN: Is it full of stuff right now?

MR. SMALL: No. He is getting ready to load it up. We have three shifts a day.

HON. MR. KELLY: When it is all finished, you have clean air going out of the stack?

MR. SMALL: Yes.

DOCTOR EVIS (Secretary): Can you give us an idea of what the scrubber unit cost?

MR. SMALL: I think it was \$16,000. I do not recall the breakdown. It has been quite a while ago. It was all made up, but I do not remember it at this time.

DOCTOR EVIS (Secretary): You think it was around \$16,000?

MR. SMALL: I think it was \$16,000.

MR. ELLIOTT: You had a terrific odour off of this plant?

MR. SMALL: Oh, no.

MR. ELLIOTT: Under the old system?

MR. SMALL: In the old place?

MR. ELLIOTT: Yes.

MR. SMALL: We still do, as a matter of fact.

MR. ELLIOTT: You are still using it?

MR. SMALL: Yes.

MR. ELLIOTT: It is not giving you enough production to supply the demand?

MR. SMALL: We do not get as many odours, even with the old stack, as we formerly did. We have gone to a synthetic type of material. We are rather pleased about that.

MR. ELLIOTT: Does this unit eliminate the old one?

MR. SMALL: Not in the foreseeable future.

MR. ELLIOTT: You have a considerable volume of business?

MR. SMALL: We have a very large volume.

MR. ELLIOTT: Is this the complete unit (indicating)?

MR. SMALL: This is the complete "sheebang".

HON. MR. KELLY: Do you use sulphite paper in that?

MR. SMALL: It is certain paper we buy. I do not know what kind it is.

HON. MR. KELLY: It is sulphite paper.

MR. SMALL: Yes. You must be an old paper man.

HON. MR. KELLY: Yes, for twenty-six years.

MR. SMALL: This (indicating) is what we call the "vapourizer".

MR. ELLIOTT: It is fired with gas?

MR. SMALL: Yes. Certain chemicals are used here, which we call "Dowtherm". It is a coal-tar derivative.

MR. NEILSON: There is no escape allowed in the mercury boiler. There is no take-off.

MR. SMALL: It simply vapourizes, and it goes up through the system, and comes back again, and keeps on going.

HON. MR. KELLY: Is this (indicating) a vacuum?

MR. SMALL: No.

HON. MR. KELLY: At Haley, they use magnesium with pigs, which are made in a vacuum. It is what they call the "pigeon process".

MR. SMALL: We have no vacuum here, and no pressure. This (indicating) operates by the heat itself. It is a heating medium.

DOCTOR EVIS (Secretary): It is the same idea

as in the refrigerators, a closed system?

MR. NEILSON: This is the receiver.

MR. SMALL: All this is turned electrically.

THE CHAIRMAN: This is the latest thing?

MR. SMALL: We think it is.

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---And the tour being declared ended, the Committee returned to the Parliament Buildings.

---Whereupon, at 4:35 of the clock, p.m., the further proceedings of this Committee were adjourned tentatively until Tuesday, October 4th, 1955, at 7:45 in the forenoon, to re-assemble at the Royal York Hotel.

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APPENDIX "A"

The Sarnia Survey: "Action without Compulsion" given before The American Society of Mechanical Engineers, Paper No. 55-APC-4, by B. C. Newbury.

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Canada is still a young country and as such its problems differ in many respects from those of Great Britain and the United States of America. Thirty years ago, its major products, cereals, fruit, metals and their ores, wood, pulp and paper, furs, etc., were all derived from the land, and this is not surprising in a country covering an area larger than the United States or Europe and supporting a population not much greater than that of New York City or London. Excluding the areas of the original Upper Canada settlements around the Great Lakes, Canada could boast of but a sparse population spread along a belt served by the transcontinental railways. Under such circumstances, limited manufacturing facilities to meet local needs were all that could be expected and air pollution problems were unheard of in the days when Great Britain and the United States were choking in the smoke of the early "Machine Age".

Note: The table and diagrams for this article will be available for inspection in the Committee's file.

Smelters - the First Offenders

The first Canadian offenders were, logically enough, the smelters. They have been in trouble for air pollution for at least 600 years and little need be said of the Trail incidents which remain even to-day as one of the classical cases of air pollution damage claims. Elsewhere, pollution by arsenic fumes has required investigation and correction while, at the present time, steps are still being taken to reduce the damage caused in the Sudbury district of Ontario. The smelters in this area were estimated to be discharging an average of $1\frac{1}{4}$ million long tons of sulphur annually during the war years.¹ Recently, a certain amount of recovery has been successfully accomplished but the magnitude of the task is indicated by relating the potential recovery to the demand. For the years 1941-45, the sulphur discharged was five times the sulphur imports into Canada, twice the United States exports and equivalent to 30 per cent of the world sulphur production. These problems, however, are not so much problems of air pollution as of engineering and commerce. The sources are well defined and usually under one management. Reimbursements for damage are heavy

1 "The Removal of Sulphur Gases from Smelter Fumes," by R. J. Cole, a report by the Ontario Research Foundation, 1947, Department of Mines, Ontario, Canada, The King's Printer, 1949, 149 pp.

and there is no lack of incentive to recover this valuable by-product.

Industrialization of Canada

As a part of a deliberate Allied policy, the industrialization of Canada which had begun in the 1930's was accelerated, so that the volume of exports of ferrous goods (mainly war supplies) increased $8\frac{1}{2}$ times between 1939 and 1943.² Similar spectacular increases were noted in aircraft and other manufactured goods. Since the war, these manufacturing facilities have been maintained for defense and civilian production, so that the demand for electric power (which is a useful measure of a country's production) increased steadily from 28 million megawatt-hours in 1939 to 48 million in 1950. To-day's figures would show an even more impressive increase.

This growing industrialization has required an increasing growth in urban population and we find that of a net increase in population of 2.5 millions during the period 1941-51, 1.7 millions were urban dwellers and only 0.8 million were classified as rural.² Thus, there is a growing tendency for cities and towns to become larger and for greater percentages of the population to be employed in pollution-producing manufacturing jobs.

2 Canada Year Book, 1951.

Pollution problems, however, exist in relatively few Canadian cities at the present time and of these cities only half a dozen can be considered to have reached a potentially dangerous state. But this is no cause for the complacency which exists in many areas. Southern Ontario has been the site of the major expansion in industrialization and is one of the few areas of the world to have experienced industrialization since the recognition of the dangers and cost of needless pollution. There is little of the inertia of well-established bad practices, which is a feature of older communities, to be overcome; nor, as yet, do these practices produce undue pollution.

Policy to Avoid Pollution

The problem in Canada, therefore, is to awaken industry to the evils of avoidable pollution, no matter how small, and thus to prevent conditions ever becoming as bad as those found during the past few decades in industrial areas in other parts of the world.

Shortly after the end of World War II, the Provincial Government of Ontario set up a Commission to survey the research needs and activities in Ontario and, as a result of the Commission's report, created the Research Council of Ontario with the primary responsibility for

correlating Government Research in the Province. The Commission, aware of the remarkable growth of Industrial Research Associations in Great Britain, recommended that co-operative industrial research be encouraged in Ontario and, to this end, the Research Council of Ontario Act contains provision for the financial support of any approved Research Project involving the co-operation of two or more companies.

Co-operative Research

Early in 1952, representatives of the Research Council of Ontario approached the managements of the three largest factories in the Sarnia area, namely, Imperial Oil Limited, Polymer Corporation Limited, and Dow Chemical of Canada Limited, to discuss the possibility of instituting a Group Research Project to study both air and water pollution in the Sarnia basin. With the companies' assent, a scheme was prepared for submission to the Council and this was accepted on March 8, 1952.

The scheme required the following action:

1. Each company to be responsible for taking and analyzing stack samples and deposited dust samples on its own site; the results of these tests to be given to the Ontario Research Foundation.

2. The air-pollution laboratory of the Ontario Research Foundation to set up stations and investigate

the air pollution in the residential and commercial districts of Sarnia and to operate a weather station. The Foundation to be responsible also for the correlation of all the data collected.

3. Water samples to be taken in duplicate at the head of the St. Clair River near Lake Huron, at the inlet to each plant and at a location well below the industrial area. Each sample to be analyzed in two different laboratories and the results forwarded to the Foundation for correlation.

4. Further water testing to be the responsibility of the Ontario Department of Health which has been monitoring the river for many years.

A subcommittee of the Research Council was formed to watch the progress of the survey, but it is convened only once a year. A local committee consisting of representatives of the three participating companies meets once a month to discuss the progress with the Foundation's air-pollution staff.

Each company finances the tests carried out on its own site, and the cost of the Ontario Research Foundation's survey is paid 50 per cent by the Government of Ontario and 50 per cent by the local industry, this part of the cost being allocated by agreement on the number of employees.

The committee makes no attempt at regulation. Its function is to discover the constituents and concentration of pollutants and to devise methods of suppression. It does not encroach on the rights of the International Joint Commission although the same techniques as used in the Windsor-Detroit Survey have been adopted where applicable, and the assistance of the Commission's Technical Advisors has been much appreciated.

THE AIR-POLLUTION SURVEY

The survey commenced in October, 1952, and, shortly afterwards, Canadian Oil Companies Limited, Cabot Carbon of Canada Limited, and Sun Oil of Canada Limited joined the group and appointed members to the committee.

Sarnia lies on the East bank of the St. Clair River, where its waters leave Lake Huron. With a population of nearly 50,000, it is the center of an area known as Chemical Valley. The heavy industry, comprising oil refineries, plastics, synthetic-rubber and carbon-black plants, lie along the river bank, roughly in a line southwest from the residential area.

Master Recording Station

A location for a master recording station was selected in Tecumseh Park, an open space about 2 miles east-northeast of the major pollution sources, Fig. 1.

This location was chosen to give data on one of the more heavily polluted parts of the residential area. Subsequent work has shown that this site is not directly along the line of the prevailing wind but there is no better alternate site available which gives the necessary freedom from local influences. The station houses a Thomas autometer, Bendix-Frieze anemometer, Hemeon and high-volume samplers, and a dust can. It has been our aim during the survey to duplicate every test made anywhere in the area with a similar test at the master station. All the data can then be referred back to the simultaneous conditions at the master station and this gives us, in effect, a datum with which all other areas may be compared.

Sampling Points

In all, 19 dust cans are in use; 9 are serviced by the Federation in the residential area and 10 in the industrial area are owned and serviced by the industries. The data from all the cans are correlated by the Foundation. In the residential area, the cans are usually located on the roofs of flat-topped buildings such as schools, and each can location is associated with a sampler location, usually within 50 yards. By arrangement with the Ontario Hydro-Electric Commission, cross arms are mounted on selected Hydro poles, about 10 ft. from the ground and drop leads are provided. It is a

simple matter to mount a filter on the cross arms and plug into the public electricity supply. By this means, any sampler can be used on any Hydro pole once the necessary fittings have been provided.

It is a matter of great pride that we have had no evidence of any vandalism or interference, not even idle curiosity, at these sample points. At one point, it is true there were threats. We were using high-volume samplers containing universal motors and certain persons in one neighborhood complained of television interference. Attempts to correct the situation by the use of Faraday screens around the machine failed to prevent television interference and eventually we were forced to abandon this sampling location to protect the machine. We have since designed and installed induction motor-driven samplers/³ which have eliminated television interference and reduced maintenance to a very low level.

Trailer Laboratory

In order to monitor the sulphur dioxide and other gases at locations other than at the master station, a mobile trailer laboratory was designed. This has enabled us to carry out runs with the Thomas autometer at a number of locations much more cheaply than could be accomplished by a series of fixed stations. The trailer is designed to work as a self-contained unit. It is 14 ft.

3 To be published soon.

x 8 ft. x 6 ft. and carries its own water supply in a 50-gal. tank, a 3-kw gasoline generator and a gasoline-fired heater. Facilities also are available to enable the laboratory to take power from the public supply. Equipped with the Thomas autometer but with empty tanks, it weighs 5000 lb.

While the unit has given satisfaction on all occasions, certain changes would be made in future units. Our unit has never had occasion to use its own power supply and it seems unlikely that in the survey of a city, such a supply ever would be needed. With one unit already available with a self-contained power supply, future units will be built to use the public electricity supply for heating and power. The towing unit is a standard station wagon which is capable of doing local hauling on level ground. It makes an ideal service tender for the various sampling stations, but, for longer hauls or in an area where even medium gradients are encountered, a vehicle similar to the Jeep or the Land Rover, having eight forward gears and optional four-wheel drive would be preferable.

During the past 2 years, a very large colume of data has been obtained and, so far, only the more obvious correlations have been obtained. We are now giving serious consideration to setting up a punch-card system

of records to allow mechanization of many of the statistical procedures.

DUST FALL

Using the classification suggested by Katz,² Sarnia may be divided into three zones. Most of the industrial area immediately south of the city is classified as medium-heavy pollution (65-100 tons/sq mile/month) and this is surrounded by a band of medium pollution (50-65 tons/sq mile/month). Most of the residential area comes in the low-pollution class (35-50 tons/sq mile/month), except for an area long the waterfront east of the main shopping area. The most interesting discovery in the dust-fall investigation is the existence of a nontypical annual variation. Most cities have a pronounced maximum dust fall during the winter months and a minimum during the summer months and this is usually considered to reflect the influence of the heating load during summer months.

Fig. 2 shows the dust fall for Sarnia for the 2 years 1953 and 1954. It will be seen that there is little difference between the summer and winter months, the summer readings being slightly higher. There is, however, a marked peak in April and May. It is thought that, unlike other cities, the local pollution in Sarnia is insufficient to mask the contribution of the shipping and

seasonal dock activities giving a relatively high summer dust fall with a spring peak where the shipping and heating loads coincide. The data available at present indicate that the ships and the associated docking activities may be responsible for a dust fall of the order of 20 tons/sq mile/month. The low readings for October are unusual, especially since this is a month when inversions and calm periods are common.

Pollution from Shipping

The International Joint Commission investigations at Detroit and Windsor have explored the possibility of reducing the pollution from shipping and it seems that little progress will be made until the St. Lawrence Seaway Project is completed and new vessels, designed for the Seaway conditions are commissioned. In the meantime, the traffic must contain a high proportion of obsolete vessels.

Much of the pollution, however, results from poor firing techniques and, during the past summer, observations were made on 250 vessels making 426 passages past Sarnia. In 56 per cent of the passages, the stacks were logged as showing No. 3 Ringelmann or worse. It should be mentioned that just above Sarnia (beneath the Blue Water Bridge) the river is relatively narrow and has a speed of 6 knots. It is understandable that vessels

making their way upstream will be getting up a good head of steam to get through this section. What is not clear is why 52 per cent of the passages show No. 3 Ringelmann or worse going downstreams compared with only 49 per cent when sailing against the current. The average of 56 per cent for all passages is somewhat better than the findings reported by Katz for 1949 and 1950 seasons surveys at Windsor and it is hoped that, by adopting Katz' procedure, the incidence of excessive smoke from shipping can be reduced at least to the figure of 35 per cent now reported at Windsor.

The yearly averages of 37 or 32.7 tons/sq mile-month for 1953 and 1954 in Sarnia lead us to hope that the pollution has been reduced during the past 2 years. However, with the limited data available, and until the meteorological conditions for the 2 years have been examined in detail, no claim can be made.

AEROSOL TESTS

Two high-volume aerosol runs have been carried out. These were designed specifically to show what increase, if any, resulted from the bringing on line of a catalytic cracker. It was found that, in general, the pattern followed that of the deposited dust, ranging from low to medium high, and no significant difference was found between the runs. The same reduction as was found

between the runs. The same reduction as was found for the deposited dust with increasing distance from the industrial zone is apparent in the aerosol readings. This reduction, however, is much less marked than the variation due to changes in the lapse rate or turbulence of the air mass. Table 1 shows the average aerosol concentrations determined by the AISI-Hemeon sampler at five locations (see Fig.1) for various wind directions. This instrument determines the optical density of a stain on a filter paper. The COH unit which defines the degree of aerosol pollution is defined as the optical density of the stain per 1000 linear feet of air filtered. These are not simultaneous determinations, and the samples are not sufficiently large to give true long-term averages.

The effect of the industrial area on R_1 and R_5 (southwest wind) and T_1 (west and northwest wind) is obvious. In the case of a north wind, it would be expected that T_2 would show the greatest pollution, but, due to the fact that a northwind is normally turbulent, the pollution which is 0.97 at R_1 and reaches 1.17 at T_1 has dropped to 0.57 at T_2 due to dispersion. This is to some extent confirmed by the values for calm periods. The level of pollution is then found to be approximately proportional to the distance from the source and T_2 gives values significantly higher than R_5 or T_3 .

SULPHUR-DIOXIDE CONCENTRATIONS

A continuous record of sulphur-dioxide concentrations has been kept at the master station since the survey started, but on no occasion has sufficient gas been found to cause concern for the vegetation in that area. As we have stated, the master station lies near a line through the major sulphur-dioxide sources and, since this line coincides approximately with the direction of the prevailing wind, the master station should indicate the worst conditions so far as the residential area is concerned. The mobile laboratory has been of great value, not only in measuring the level of sulphur dioxide and other pollutants in other parts of the residential area, but in indicating the relative contributions of the various sources to the total pollution recorded at the master station.

Fig. 3 and 4 show in the form of polar diagrams the results for the master station and the mobile unit for a period of several weeks during the Fall of 1953. These show clearly the effect of wind direction at the two locations, and the individual contributions to the total pollution of the various groups of sources.

METEOROLOGY

Records are kept at the master station of the usual meteorological data, but we feel, above all else, that data are needed on the vertical temperature distribution

in this area. There happens to be no local television transmitter to which thermometers could be attached, and, in spite of the flat terrain, we do not feel justified in using data from Detroit or London, Ontario, both of which are 60 to 80 miles away. We have considered using the Blue Water Bridge but, in this connection, our experience with the anemometers is of interest.

Some time after the master station was set up, an industrial firm set up another Bendix-Frieze anemometer at a height of 100 ft. near the edge of the river. Correlation of the data from the two recorders shows that for 60 per cent of the time the wind has two to three times the velocity and has backed 45 deg. at the river compared with the master station. It is, of course, recognized that a river basin canalizes the wind but it is probably not appreciated how much a river can change the wind direction over a distance of a mile or two over flat terrain.

Another meteorological phenomenon which deserves mention is wind reversal. Altogether seven incidents have been noted, each characterized by a sudden but large increase in pollution for a short period. These have been found to be associated with the passage of a front resulting in a double wind reversal, the wind direction changing from north to south and back to north over a period of about an hour. This type of occurrence, which can peak the sulphur-dioxide reading from a normal high of 0.2 ppm up to 1.5 ppm

in a few minutes has been observed in other parts of Ontario but, as far as is known, has not been reported elsewhere.

PUBLIC RELATIONS

An account of the work in the Sarnia area presented, as this is, within the United States, cannot ignore the tribulations of the neighboring city of Port Huron. Intermittent, and at times severe, pollution can and has originated in Sarnia from accidental causes. These incidents are regrettable, but are no more avoidable than automobile or other accidents. They are a source of anxiety and financial loss to the plants concerned and every effort is made to prevent them. In one particular location, it is thought that minute leaks of two components in two different factories, each alone being unnoticeable and harmless, combine in the air after a definite time interval to give a highly aggressive lacrymator. In June 1953, a large number of complaints were received from Michigan and drastic steps were taken to prevent the slightest trace of leakage from these plants in the future. The Foundation has been prepared since that time to act immediately to secure samples should another occasion arise and to attempt to identify positively the active agent. Since that time, however, we are happy to say the opportunity has not arisen.

It is understood that representations may be made to the International Joint Commission concerning the movement of pollutants across the International Border so that further discussion of this aspect of the survey would at present be inappropriate.

CONCLUSION

The foregoing has given an account of the organization and scope of the survey. The success of the enterprise, however, is not to be measured by physical means. With an initial nucleus of two or three forseeing managements, a gesture was made to the public, and a chain reaction was started. Among the benefits that have accrued, we may cite the following:

- 1 A surge of interest in air pollution.
- 2 Requests by other industries to participate.
- 3 A flow of facts based on quantitative measurements.
- 4 Cooperation with the City Council.
- 5 Improved public relations and improved public appreciation of the problems.
- 6 A spontaneous interchange of experience and data between members on pollution control.
- 7 A continuous study in each plant of the pollution problems, both present and future.

To realize these benefits and to take the action implied by the survey data require that the industrial representatives should have a good technical background but

should also have the confidence of top managements in their ability to make sound recommendations. The facts are not an end in themselves. They are signposts and it is the duty of the members of the committee to see that action is taken accordingly. In this respect, we count ourselves lucky to be associated with the Sarnia Project. A reasonable portion of the committee members represent oil companies, and oil companies are especially aware of the dangers of loss and pollution. This makes for a more sympathetic response than might be found in other industries. Nevertheless, we are convinced that if only two manufacturers in an area would cast aside their fear that to measure air pollution is a certain sign of guilty conscience or even an admission of guilt, and if these two manufacturers would go ahead, fearlessly and publicly, to gather facts and act on them, their action would leaven the inertia of the remainder and much good would result.

We consider that it is fundamentally wrong and mildly undemocratic for a city to have to legislate against air pollution and provide an enforcement agency as far as industry is concerned. Industry has the know-how, the manpower and the facilities to do the work far better itself; legislation should be reserved for use against the non-conformers only. We are convinced that there exist today sufficient enlightened managements to create a surge of co-operative investigation with all the good will such co-operation engenders. The remainder must follow - or flout public opinion.

